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ABSTRACT

This report contains specifications for a motorcycle safety education curriculum designed to reduce the incidence and severity of motorcycle accidents. The specifications prescribe objectives, prerequisites, methods, materials, equipment, facilities, and proficiency measures for six units of instruction: (1) basic riding skills, (2) street riding principles, (3) street riding skills, (4) maintenance, (5) off-street operation, and (6) preparation for travel. The instructional units are intended to be configured in a variety of ways in order to accommodate the range of interests and experience levels that characterize individuals seeking motorcycle instruction. Six specific courses are identified: basic on-street, basic off-street, comprehensive improvement, on-street transition, and off-street transition. It is reported that the instructional program, developed from the specifications by the Motorcycle Safety Foundation, was pilot tested on forty-eight students and revised to reflect experiences gained during the pilot test. (Author/CSS)

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MOTORCYCLE EDUCATION CURRICULUM SPECIFICATIONS

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16. Abstract

This report contains Specifications for a Motorcycle Safety Education Curriculum designed to reduce the incidence and severity of motorcycle accidents. The Specifications prescribe objectives, prerequisites, methods, materials, equipment, facilities, and proficiency measures for six units of instruction as follows:

Unit I - Basic Riding Skills
Unit II - Street Riding Principles
Unit III - Street Riding Skills
Unit IV - Maintenance
Unit V - Off-Street Operation
Unit VI - Preparation for Travel

The instructional units can be configured in a variety of ways in order to accommodate the range of interests and experience levels that characterize individuals seeking motorcycle instruction. Six specific courses have been identified.

An instructional program was developed from the Specifications by the Motorcycle Safety Foundation. It was pilot tested on 48 students during the summer of 1976. The Specifications have been revised to reflect experiences gained during the pilot test.

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Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
		LENGTH		
in	inches	*2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
		AREA		
in^2	square inches	6.5	square centimeters	cm^2
ft^2	square feet	0.09	square meters	m^2
yd^2	square yards	0.8	square meters	m^2
mi^2	square miles	2.6	square kilometers	km^2
	acres	0.4	hectares	ha
		MASS (weight)		
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
		VOLUME		
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft^3	cubic feet	0.03	cubic meters	m^3
yd^3	cubic yards	0.76	cubic meters	m^3
		TEMPERATURE (exact)		
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

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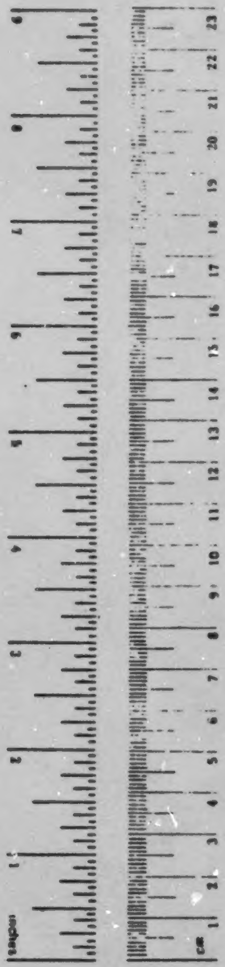
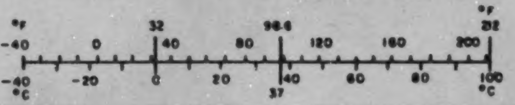
*1 in ≡ 2.54 (exactly). For other exact conversions and more detailed tables, see NBS Misc. Publ. 286, Units of Weights and Measures, Price $2.25, SD Catalog No. C13.10:286.



Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
		LENGTH		
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
		AREA		
cm^2	square centimeters	0.16	square inches	in^2
m^2	square meters	1.2	square yards	yd^2
km^2	square kilometers	0.4	square miles	mi^2
ha	hectares (10,000 m^2)	2.5	acres	
		MASS (weight)		
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	
		VOLUME		
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m^3	cubic meters	35	cubic feet	ft^3
m^3	cubic meters	1.3	cubic yards	yd^3
		TEMPERATURE (exact)		
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F



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PREFACE

This report provides a preliminary set of specifications covering requirements for motorcycle safety education curricula. The specifications were developed by the National Public Services Research Institute (NPSRI) under contract to the National Highway Traffic Safety Administration (NHTSA) (Contract No. DOT-HS-5-01182).

The NPSRI effort was directed by Dr. A. James McKnight, Principal Investigator, and Dr. Kenard McPherson, Co-Principal Investigator, Dr. Duane Johnson, Northern Illinois University, prepared the initial draft of the specifications upon which this report is based.

In developing specifications, the NPSRI staff worked closely with representatives of the Motorcycle Safety Foundation (MSF). Dr. Allen Robinson, Mr. James Bloomquist, Mr. Adam Johnson, and Mr. James Smith also contributed to the specifications.

Appreciation is expressed to Kawasaki Motors Corporation for providing motorcycle equipment used in studying educational requirements.

Mr. Herbert Miller, NHTSA Contract Technical Manager, contributed substantially to the methodology and format employed in the Preliminary Specifications.

In addition to those named above, the following individuals contributed extensively to the Preliminary Specifications through review and consultation:

Mr. Bruce Cummings, Kawasaki Motors Corporation
Mr. Stuart Munro, Ministry of Transport (Canada)
Dr. Wayne Muhler, National Public Services Research Institute
Mr. David Paull, Right Track Driving School
Mr. Robert Razor, American Motorcyclist Association
Mr. Robert Roush, Iowa Department of Public Instriction

Other of the NPSRI staff assisting in preparation of these specifications are Mrs. Molly A. Green, Mrs. Wanda Dorpfeld and Mrs. Ruth Rishert.

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INTRODUCTION

The number of motorcycles operating on the public highways has increased markedly during the past decade. According to the Insurance Institute for Highway Safety (IIHS 1975) motorcycle registrations have doubled during each of the last two five-year periods. The growth of motorcycle ridership has added substantially to the highway death toll. A report by Robertson and Baker (1975) shows the fatality rate for motorcycles to be approximately three times that of automobiles.

One of the factors contributing to the high motorcycle accident rate is lack of proficiency on the part of operators. Statistics have shown that an inordinately high proportion of accidents occur during the first six to twelve months of riding (Reiss and Haley, 1968; Waller, 1972). This finding points to a critical need for programs of motorcycle safety education that will endow new riders with the skills and knowledges they need to survive the first perilous year of operation.

MOTORCYCLE SAFETY EDUCATION

The high accident rate which characterizes the motorcycle rider's first year of operation attests to the need for a formal program of motorcycle safety education. At the present time, this need is a long way from being met. Programs available for novice motorcycle riders are largely confined to the following:

- Community Programs--Sponsored by community agencies such as police, motorcycle clubs, or service organizations. Generally these programs are limited in scope and emphasize the recreational aspects of riding rather than survival in the traffic environment.

- Adult Education Programs--Taught through the public school system but available primarily during non-school hours and at a fee, both of which tend to discourage widespread participation.

- Secondary School Programs--Conducted by the public school system but also primarily outside of school hours and at a fee.

- Dealer Programs--Sponsored by manufacturers and dealers and often having goals that are more promotional than educational.

Two states currently require motorcycle safety education programs for riders under the age of 18. However, even in these states many communities lack the personnel and financial resources to provide programs.

A number of factors have impeded the widespread introduction of motorcycle safety education into the public school system. Foremost among these are the following:

1. Image--Probably the biggest obstacle to the introduction of motorcycle safety education to public schools is the "black leather jacket" image that hangs over motorcycle operation--at least that which occurs on public streets. The motorcycle is patently the black sheep of the transportation family. While motorcycle ridership has changed considerably in the last several years, stimulated to a great extent by the fuel shortage, the traditional image endures. Many parents feel that making motorcycle instruction available to high school use is simply giving encouragement to a social evil.

2. Instructors--Few high school teachers have the combination of motorcycle operating skill and knowledge of traffic safety that is required to teach motorcycle safety education. Thanks to the efforts of the Motorcycle Safety Foundation (MSF) and a number of other organizations, motorcycle instruction is making its way into teacher preparation programs. In time, a sizeable number of driver education teachers will be knowledgeable in the operation of motorcycles. Yet, being knowledgeable is a long way from being a skilled operator. It will be some time before school systems are able to obtain people with both the competence and creditability needed to provide comprehensive motorcycle instruction.

3. "Extracurricula" nature--The public at large doesn't view motorcycle riding as an essential activity like reading, writing, arithmetic--or even driving. Therefore, even when motorcycle instruction has entered the public school system, it has been typically treated as an extracurricular activity, taught after school hours. This status does not tend to give motorcycle instruction a great deal of appeal.

4. Funding--One consequence of being an unessential activity is the inability to share in general educational revenues. Nor is motorcycle safety education very often privileged to share in the highway safety funds generated from license fees, registration fees or traffic fines. The lack of outside funding means that motorcycle safety education must be supported completely or in part through student fees. This further detracts from its appeal.

DEVELOPMENT OF MOTORCYCLE SAFETY EDUCATION PROGRAMS

The mere institution of motorcycle safety education programs will not automatically bring about a reduction of motorcycle accidents. If it is to have any impact upon the number and severity of motorcycle accidents, motorcycle safety education must utilize curricula that are designed specifically to achieve that end. A curriculum design process directed toward accident reduction would involve the following four steps:

1. Task Analysis--Analysis of the motorcycle operator's tasks to identify those performances that are essential to safe operation and an identification of the knowledges and skills that underlie those performances.

2. Determination of Instructional Objectives--Establishment of essential performances, knowledges, and skills as objectives of a motorcycle safety education curriculum.

3. Design of Curriculum Structure--Organize instructional objectives into an effective learning sequence.

4. Design of Methods and Materials--Design of the instructional methods and materials capable of leading to attainment of instructional objectives.

The first two steps have already been carried out. The Motorcycle Safety Foundation (MSF) completed in 1974 an Analysis of Motorcycle Operator Tasks (McKnight and Heywood) and a Determination of Motorcycle Safety Education Objectives (McKnight and Pote). The remaining steps involve determining what is required of a curriculum for it to be capable of leading to achievement of instructional objectives. The requirements must cover (1) an overall course structure that will accommodate the different needs and capabilities of students, teachers and schools, (2) instructional methods capable of leading to effective learning, and (3) materials required to support selected instructional methods. These requirements must be documented in the form of specifications capable of guiding the development of the materials--teacher lesson plans, student texts and workbooks, instructional aids, equipment, and facilities--that bring a curriculum into being.

ROLE OF SPECIFICATIONS

Relatively few curriculum development efforts have been preceded by the preparation of specifications. More often than not, teachers simply select from available materials those that seem to cover what they want. They assemble these materials in some kind of sequence and that becomes a course. It is rather like building a house without a blueprint.

OBJECTIVE OF SPECIFICATIONS

The objective in preparing these specifications is to provide a source document that can be used in the development of motorcycle safety education curricula. The specifications are not a curriculum themselves. A curriculum identifies the particular instructional techniques, textbooks, media, training equipment, course hours, number of students, facilities, and so on that are needed to teach. This specification, like a specification for a material item, only identifies essential requirements to be fulfilled in a way that meets the interest, needs and resources of the individuals and organizations that are doing the teaching.

Preparing a set of specifications to guide curriculum development has the following advantages:

Planning--The specifications provide an aid to planners in making decisions as to the nature of motorcycle safety education curricula to be developed.

Development--The specifications provide a set of requirements that may be used by educators in development of their own curricula.

Coordination--The specifications provide a single source through which different individuals, working at different locations, can coordinate their efforts.

Standards--The specifications provide a set of requirements which may be used by regulatory agencies to define standards for development of curricula.

PROJECT OBJECTIVES

The objective of the project described in this report was to prepare a set of Specifications capable of guiding development of effective motorcycle safety education programs. To offer this capability, Specifications had to have the following characteristics:

Validity--Specifications, when fulfilled, must result in a motorcycle safety education program that is a cost-effective accident countermeasure.

Sufficiency--The contents of the Specifications must be sufficiently comprehensive and detailed to prescribe fully the essential requirements of an effective motorcycle safety education program.

Utility--Specifications, when placed in the hands of competent curriculum developers, must enable them to fulfill the prescribed requirements.

This report describes the specifications that were prepared in fulfillment of the above objectives. The report is divided into the following sections:

Development of Specifications--A description of the methods used in developing and testing the content of the specifications.

Content of Specifications--A description of the types of requirements identified in the specifications and the manner in which they are organized.

Course Specifications--A description of the specifications that apply to all elements of motorcycle safety education.

Unit Specifications--Separate sections containing the specifications for each of the six units of instruction.

DEVELOPMENT OF SPECIFICATIONS

This section summarizes the methodology used in developing the specifications. Specific elements of methodology include:

- Determination of goals and constraints
- Development of preliminary specifications
- Pilot test
- Results of pilot test
- Revision of specifications

DETERMINATION OF GOALS AND CONSTRAINTS

The requirements of an educational program are completely shaped by the goals the program is intended to fulfill, and the constraints imposed by the capabilities and limitations of individuals and organizations participating in the program. This section will discuss both influences.

Goals of Motorcycle Safety Education

The ultimate goal of motorcycle safety education, as it is addressed by these specifications, is to enable motorcycle operators to cope safely with the full range of demands imposed by the motorcycle's operating environment. In other words, it is designed to enable people to go where they want to go without harming themselves or others.

For convenience sake, the overall goals of motorcycle safety education can be subdivided in terms of both the objectives toward which students are being trained and the level of proficiency involved.

Classifying courses by objectives results in the following major categories:

- On-Street--Instruction intended to enable students to operate in the highway/traffic environment.
- Off-Street--Instruction directed toward recreational riding in off-street areas such as trails.
- Maintenance--Instruction intended to enable students to maintain and service their own motorcycles.

Classifying instruction by level of proficiency results in the following two major categories:

- Basic--Instruction intended to enable students to attain the minimum levels of proficiency required for safe performance.

- Advanced--Instruction intended to enable minimally qualified students to attain higher levels of proficiency.

Let us examine each category of objective and the two levels of proficiency within each.

On-Street Instruction

Both basic and advanced levels of on-street instruction appear appropriate for inclusion within a set of motorcycle safety education specifications.

Basic On-Street instruction is the two-wheel counterpart of driver education. It aims at providing students with the minimum levels of skills and knowledge required to survive in the highway and traffic environment. The vast majority of current motorcycle safety education programs are Basic On-Street programs.

Advanced On-Street instruction aims at providing the higher levels of skill needed in contending with various hazards of the highway and traffic environment. It certainly is appropriate to a safety education program.

Off-Street Instruction

Accidents occurring in the off-street environment consist primarily of falls and collisions with fixed objects and are, therefore, not nearly as severe as those occurring on the street. However, they are more numerous. Just how numerous no one knows since they do not have to be reported to anyone. However, judging from the number of broken limbs, cuts, abrasions and other injuries logged by emergency rooms, this problem is one of large magnitude. While few fatalities are involved, they add up to a considerable cost in medical bills and lost work time.

Basic off-street instruction directed toward enabling riders to cope safely with the rigors of the off-street areas appears to be a legitimate part of motorcycle safety education. However, instruction aimed at enabling riders to compete with one another, or compete with the elements by undertaking greater challenges may be considered outside the scope of safety education programs. This exclusion eliminated many off-street tasks from basic instruction and also eliminated advanced off-street instruction entirely.

Maintenance

A poorly maintained motorcycle is a hazard to its operator. Basic instruction in keeping a motorcycle properly maintained is therefore an important element of motorcycle safety education.

A large number of relatively complex servicing and repair tasks can be performed without expensive tools, test equipment, or facilities, and without requiring a high degree of mechanical skill. This fact, along with the fact that qualified motorcycle mechanics are in short supply in many areas tends to encourage many operators to attempt to perform advanced maintenance jobs by themselves. This is an advantage to them so long as the work is properly performed. However, a botched job exposes the operator to serious hazard. For this reason, the ability of operators to perform advanced maintenance tasks and to distinguish what they can safely do from that which requires recourse to professionals, merits inclusion among the goals of motorcycle safety education.

Constraints

The requirements of an educational program are also shaped by the constraints imposed by the circumstances under which they are administered. Some of the constraints imposed upon motorcycle safety education were alluded to earlier in describing obstacles to the institution of motorcycle safety education courses. Public resistance to motorcycle safety education, lack of funds, and shortages of qualified teachers limit the extent to which motorcycle safety education can be integrated into school curricula. Current motorcycle safety education programs were studied to identify operating constraints in more specific terms. Valuable sources of information were (1) the results of a statewide adult education program conducted in the State of California with the assistance of the Motorcycle Safety Foundation, (2) a nationwide survey of 53 motorcycle safety education programs, conducted jointly by the project staff and the Motorcycle Training Subcommittee of the Transportation Research Board (TRB), and (3) the general experience of project staff personnel and project consultants in the administration of motorcycle safety education programs.

Student Related Constraints

The variability in characteristics of motorcycle safety education students imposes requirements that are not found in programs having a more homogeneous student input population. This variability includes student age, riding experience, and interest.

Age--The great majority of motorcycle safety education students are teenagers. In the TRB survey, the average age was determined to be under 21 in 86% of the programs. However, this still leaves 14% of programs in which the average age is over 21. In fact, in 2 out of the 53 programs, the average age was over 30.

In courses taught outside of the high school system, the range of ages in any one class may be quite large. For example, in the adult education program conducted in California, ages ranged from 11 to 66 years.

General Driving Experience--Variation in age brings with it considerable variation in general vehicle operation experience. The TRB survey disclosed that in approximately 2/3 of the programs, less than half of the students hold a valid driver's license. This means that the student population consists primarily of individuals lacking general driving experience and the knowledge of rules of the road, safe driving practices, and defensive driving techniques that accrue to such experience.

Motorcycle Operating Experience--One might not expect much interest in motorcycle safety education on the part of experienced riders. However, a significant number of motorcycle safety education students have ridden before. Some are attempting to make the transition from one environment to the other; for example, recreational riders turning to the motorcycle as a form of transportation and attempting to acquire knowledge of safe street operation. The number of experienced off-street riders seeking instruction would probably increase with the introduction of laws requiring formal motorcycle safety education of those under 18, with the issuance of insurance discounts to those will to enter instruction. Some movement in the other direction--from the highway to the trails--may also occur as those buying a motorcycle purely for transportational purposes become interested in recreational riding.

The second major category of students having previous riding experience consists of adults returning to motorcycle operation after a long lapse of time. A significant number of these "retreads" enroll in motorcycle safety education both to recapture old skills and to learn what has been discovered or invented during the time they have been away from the motorcycle.

Student Interests--The interests of students vary as much as their backgrounds. Some students are interested in learning to ride a motorcycle as a means of transportation, others as a form of recreation. Some students are content simply to ride the motorcycle while others want to learn all about its inner workings. A motorcycle safety education program must accommodate this wide range of interests if it is to be widely attended.

Resources Constraints

The resources available to support motorcycle safety education will influence such things as the length of the course, number of classes, amount of on-bike practice, instructional aids, and training facilities.

The TRB survey discloses that slightly over half of motorcycle safety education courses are supported to some extent through student fees. In 25% of courses, all of the expense is borne by students.

Approximately half the schools responding to the TRB survey were limited to one or two classes a year. A typical course provided 6-10 hours of classroom instruction up to 8 hours of range instruction and 1-3 hours of on-street instruction.

Policy Constraints

The manner in which motorcycle safety education is administered is highly sensitive to the policies of the host institution. Few schools are as hospitable to motorcycle instruction as they are to driver education. Slightly less than half of the programs emcompassed by the TRB survey were a formal secondary school activity. Another 10% were part of adult education programs. The remainder appear to be taught outside of the formal public school system.

Policy also influences *what* is taught in motorcycle safety education. One aspect of motorcycle instruction that is frequently constrained by policy is on-street instruction. This phase of instruction is often bypassed, owing to the unwillingness of some insurance carriers to write policies covering it. Thirty percent of the schools responding to the TRB survey did not offer on-street instruction, while another 45% restricted it to 1-3 hours.

Effects of Constraints

Various constraints described above are not immutable; they merely describe the present state of motorcycle safety education. Resources and policies can be changed with the stroke of a pen. The constraints imposed by the interests and backgrounds of students are also susceptible to change, although over a longer period of time.

Change is particularly likely to occur if motorcycle safety education is shown to be an effective countermeasure. There is a certain circularity to this in that evidence of effectiveness will not be forthcoming so long as present constraints prevent an effective course from being taught. In developing the specifications it was, therefore, necessary to attempt a distinction between constraints that are truly an inherent part of motorcycle safety education and those that merely reflect current limitations. The latter were not allowed to interfere with the formulation of requirements that were viewed as critical to effective motivation.

In reviewing the specifications themselves it will be apparent that many of the requirements could not now be met by organizations currently sponsoring the motorcycle safety education programs. To limit requirements to those that are capable of being met at the present time would be to bind the future by the present. The purpose of identifying requirements that are beyond the current state-of-the-art is to help guide future developments--development techniques, materials, equipment, facilities--toward worthwhile objectives.

DEVELOPMENT OF PRELIMINARY SPECIFICATIONS

A set of Preliminary Specifications for Motorcycle Safety Education programs capable of fulfilling essential objectives within real constraints was prepared by the project staff. These specifications set forth curriculum requirements in terms of the same elements as appear in the Final Specifications in Part II of this report, namely instructional objectives, prerequisites, instructional methods, instructional materials, and proficiency assessment measures. They differed from the Final Specifications in two respects. First, they were organized strictly in functional terms, that is, in terms of the rider performances they were designed to support, rather than in terms of the instructional sequence in which a curriculum would be administered. Secondly, they were far less detailed than the Final Specifications, stating requirements at a more general level.

Sources of Content

The primary source of instructional objectives was the Motorcycle Safety Foundation's "Motorcycle Task Analysis" (McKnight and Heywood, 1974) and the "Instructional Objectives for Motorcycle Safety Education" (McKnight and Pote, 1974). Sources used in establishing requirements for instructional methods and materials were far more extensive. They may be classified as follows:

> Course Guides--Teacher guidance materials prepared by universities, government agencies, and professional organizations.
>
> Informational Materials--Publications, including textbooks and pamphlets, prepared by textbook publishers, motorcycle manufacturers, universities, governmental agencies, and safety organizations.
>
> Audiovisual Materials--Slides, filmstrips, and films prepared by media organizations, manufacturers, the armed services, and safety organizations.

It is safe to say that the great majority of motorcycle instructional materials available within United States and Canada were reviewed by the project staff in establishing the content of the Preliminary Specifications.

Review and Revision

An initial draft of the Preliminary Specifications was prepared and disseminated among individuals representing various elements of motorcycle safety education, including high school instruction, teacher preparation, State supervision, recreational riding, and media development. Reviewers were invited to comment upon the validity and practicality of the requirements set forth in the Preliminary Specifications. Upon completion of this review process, a panel was assembled in Washington, D. C. for a two-day meeting in which the draft and reviewer comments were discussed and inconsistencies resolved. Individuals participating in the review process appear below. Those whose names are marked with an asterisk took part in the two-day panel review.[1]

*	Mr. James Bloomquist	Motorcycle Safety Foundation
	Mr. Bruce Cummings	Kawasaki Motors Corporation
	Ms. Ruth Huges	Aetna Life and Casualty Company
	Dr. Kent Jesse	Kawasaki Motors Corporation
*	Mr. Stuart Munro	Transport Canada
	Mr. David Paull	Right Track Driving School
*	Mr. Robert Rasor	American Motorcyclist Association
	Dr. Allen Robinson	Motorcycle Safety Foundation
*	Mr. Robert Roush	Iowa Department of Public Instruction
	Dr. Jack Weaver	Texas A & M University
	Mr. Lester K. White	American Honda, Inc.

The drafts of the Preliminary Specifications were revised on the basis of panel review. Approximately a third of the original content was altered as a result of the review process. The revision was submitted to NHTSA as an Interim Report (McKnight, McPherson and Johnson, 1976).

PILOT TEST

To evaluate the validity of the requirements set forth in the Preliminary Specifications, a Pilot Test was conducted jointly by NPSRI and the staff of the Motorcycle Safety Foundation (MSF). The Pilot Test included the following activities:

> Preparation of Materials--Preparation of student materials, instructor materials, and instructional aids based upon the requirements set forth in the Preliminary Specifications.
>
> Administration of Pilot Test--The administration of a course utilizing the materials prepared from the Preliminary Specifications.

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[1] The organizations listed are those represented by the reviewers and panelists at the time the activity took place.

Preparation of Materials

Materials required in support of Pilot Test Instruction were prepared jointly by NPSRI and MSF. All materials were based upon requirements set forth in the Specifications.

Student Materials

MSF revised the textbook for its "Beginning Rider Course" to conform to requirements set forth in the Preliminary Specifications. The resulting text was entitled "Motorcycle Rider Course" (MSF 1976a). At the time the Pilot Test took place, the Motorcycle Rider Course was in its final draft stages. This draft was reproduced by MSF in sufficient copies to support the Pilot Test.

Two areas not covered by the Motorcycle Rider Course were motorcycle maintenance and off-street operation. Maintenance instruction was supported by a combination of (1) owners manuals supplied with the vehicles used in training, (2) shop manuals prepared by motorcycle manufacturers, and (3) materials provided by the professional mechanic engaged as a maintenance instructor.

A number of available trail riding texts were reviewed as potential candidates for student material in support of off-street instruction. The publication "How to Select, Ride, and Maintain Your Trail Bike" (Richmond, 1972) was selected as being the most comprehensive with respect to requirements for off-street riding set forth in the Preliminary Specifications.

Teacher Materials

In support of classroom and laboratory instruction, the project staff prepared lesson plans utilizing instructional methods appearing in the Preliminary Specifications. Classroom instruction was structured primarily by the content of the information to be presented and discussed and, therefore, presented no particular problem. The primary effort was directed toward devising specific laboratory activities that were consonant with specified requirements. In this regard, lesson plans drew heavily upon existing curriculum materials.

At the time teacher materials were being developed, MSF was in the process of preparing an Instructor's Guide as part of its Motorcycle Rider Course (MSF 1976b). While this document was based upon the Preliminary Specifications, it was not sufficiently completed to be used in the Pilot Test. However, it constituted one of the more useful sources of information used in preparing teacher materials.

Instructional Aids

MSF contracted for development of four 16mm films and three audio/cassette filmstrips as part of the Motorcycle Rider Course. The content of these audiovisual aids were in conformance with the Preliminary Specifications. Unfortunately, the period of time available between completeion of the Preliminary Specifications and the start of the Pilot Test was not long enough to accommodate the entire audiovisual development cycle. However, by delaying the Pilot Test as long as the project schedule and Maryland climate permitted, it was possible to utilize the early work prints as instructional aids. Actually, the fact that the aids were in the form of work prints did not in any way lessen their effectiveness. Further, it had the advantage of allowing the final products to benefit from the experiences gained in the Pilot Test.

The NPSRI project staff prepared 16mm motion picture films to support off-street instruction as well as 35mm slides to fulfill instructional aid requirements, not part of the MSF series.

Administration of the Pilot Test

The Pilot Test was administered during August of 1976 at the Motorcycle Safety Foundation's facilities in Linthicum, Maryland.

Students

Subjects for the Pilot Test consisted of 25 students selected from individuals responding to a solicitation offered through newspaper ads, radio messages, and announcements placed in public places. They were permitted to enroll in any of the six courses described in Part II. There was no charge for the program, although a returnable deposit was collected to help insure that those who enrolled actually participated in and completed instruction. Enrollment was almost equally divided between males and females (13 females, 12 males). Ages ranged between 20 and 56 for males, 18 and 50 for females. This distribution is fairly typical of an out-of-school program.

The actual numbers enrolled in each of the six courses is not particularly meaningful. However, it is worth noting that (1) the "Comprehensive" course was the most popular, (2) about half of the students enrolled in off-street instruction, and (3) each of the six courses attracted at least some students.

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Personnel

The courses were taught primarily by representatives of the MSF and NPSRI staffs. MSF had primary responsibility for basic and on-street instruction, while NPSRI assumed major responsibility for off-street instruction and advanced skill development. A professional mechanic, engaged by MSF, was responsible for maintenance instruction.

Equipment and Facilities

Equipment and facilities required in support of instruction were provided by MSF. These included the following:

- Individual motorcycles for each student and instructor.
- Individual helmets and eye/face protection for students not having their own.
- Audiovisual projection equipment.
- Classroom facilities capable of accommodating the 12 students assigned to each class.
- A paved range facility, the dimensions of which exceeded those called for in the specifications.
- Supplies, including traffic cones, oil and gasoline, student vests, and spare parts.

Schedule of Administration

Classes were given in two-hour blocks, two evenings during the week and once on Saturday. Except during on-street instruction, the student sample was divided into two groups of 12 students each. This meant there were actually class meetings 4 evenings a week and twice on Saturday. Since only 12 students enrolled in off-street instruction, only one group was involved in the off-street phase.

The schedule of individual classes followed the general sequence set forth in the Preliminary Specifications. The attempt was made to follow an alternating class-lab schedule such that each two-hour block consisted of a classroom session followed by a related laboratory session. A few exceptions to this schedule were necessitated by bad weather and, in the later stages of the program, the early onset of darkness during the week. The content of each week can generally be characterized as follows:

First week: basic riding skills

Second week: street riding principles

Third week: street riding skills, motorcycle maintenance, preparation for travel.

Fourth week: off-street operation

EVALUATION OF INSTRUCTIONAL METHODS

An additional effort was made to evaluate requirements set forth in the Preliminary Specifications. Although not strictly a part of the Pilot Test, this study is worth noting.

The study concerned the roles to be played by independent study and classroom instruction. The Specifications give great emphasis to the use of independent study materials as a means of communicating required information to students and look to classroom instruction to provide experiences in which students review and apply the information they have acquired through independent study. Educators have generally acknowledged that this approach represents the most cost-effective use of instructional time. The attempt to employ this approach has been generally thwarted by a number of factors, chief among which is the unwillingness of students to utilize independent study materials in advance of classroom instruction.

It has been hypothesized that students might be more likely to engage in independent study of motorcycle-related materials because of their inherent interest value. To test this hypothesis, an experiment was conducted by Dr. Duane Johnson, at Northern Illinois University. Some 78 students entering a beginning motorcycle rider course were randomly divided into Presentation and Problem-Solving groups. Both groups were given the same student materials (the MSF "Beginning Rider Course"), and equivalent amounts of classroom instruction. In the case of the Presentation group, the classroom instruction was given over entirely to a teacher presentation of informational content. In the Problem-Solving group, however, the teacher conducted group exercises in which students applied information gained from the student materials to the solution of classroom problems. In commonly used terms, the Presentation group received "teacher centered" instruction, while the Problem-Solving group received "student centered" instruction.

Each of the groups was administered two equivalent forms of a knowledge test prepared by the NPSRI project staff in connection with another project (McPherson and McKnight, 1976). The Presentation group achieved mean scores of 64.96 and 71.06 on the two tests, while the Problem-Solving group achieved scores of 69.57 and 74.22. While the differences are small, they are statistically significant ($P < .05$).

The results of this small study could never form the basis of a requirement for a student centered approach. However, they do support the contention, made in the Specifications, that independent study can be utilized to advantage in motorcycle safety instruction.

RESULTS OF PILOT TEST

The purpose of the Pilot Test was to (1) determine whether a curriculum configured so as to meet Specification requirements would be effective in leading to attainment of instructional objectives, and (2) identify specific deficiencies in the curriculum that reflect deficiencies in the Specifications themselves. In order to assess the effectiveness of the curriculum and to identify specific deficiencies, representatives of the project staff monitored each instructional session and recorded their observations relative to the following:

- Overall progress of students relative to session objectives.
- Specific student errors.
- Implications of errors upon instructional methods and materials.
- Directly observed deficiencies in instructional methods and materials.
- Inappropriate time allocations.

No formal tests were administered as part of the Pilot Test.[1/] No available test would have been capable of assessing the overall effectiveness of the curriculum in the absence of some comparison control group, or is any existing test capable of identifying specific deficiencies relative to those characteristics that represent specification requirements.

Overall, the curriculum, as administered in the Pilot Test, appeared capable of leading to the attainment of specified objectives. The students, in their evaluation of the curriculum, rated major categories of method and material in the "excellent" or "good" category in almost all cases. However, it was very apparent that the curriculum was capable of considerable improvement. The specific deficiencies observed are too numerous to list here--nor would it serve any purpose to do so since they apply to the Preliminary Specifications and not to those appearing in Part II. However, the major areas of deficiency are summarized below.

[1/] The Specifications do not require administration of formal tests. While appraisal of student performance is necessary at various points throughout the course (e.g., prior to on-street instruction), the Specifications recognize that such an appraisal may be made just as well by an insightful teacher on the basis of the student's total performance than by test instruments on the basis of very limited performances.

Level of Detail

Requirements in the Preliminary Specifications were carried only to the level of detail that could be justified by the weight of available evidence. Where there was one "best" way of meeting a particular requirement, that way was detailed. If, however, the requirement could be fulfilled in many equally acceptable ways, it was not further detailed.

The teacher materials generated from the Preliminary Specifications were, on the whole, no more detailed than the Specifications themselves. As a result, teachers in the Pilot Test were left a great deal of latitude in deciding upon content and method. This latitude often resulted in instruction which was not effective in leading to the attainment of objectives. Important information would be left out of classroom discussions and reviews; laboratory instruction frequently failed to result in instruction and practice relative to important procedures.

The solution to the problem is not necessarily to provide more detailed guidance and teacher materials. It should be possible to assume that teachers are sufficiently knowledgeable in content and method of instruction that they require only enough guidance to help them organize and remember what they already know. The burden of seeing that teachers possess the requisite knowledge and skill falls upon teacher preparation.

Regardless of how teachers are to acquire their knowledge of instructional content and methodology, it is up to the Specifications to see that requirements are specified in sufficient detail that important elements of content and methodology are identified.

Time Allocations

The time allocated to various activities was insufficient to lead to attainment objectives. Since there were almost no instances of excessive time allocations, the net effect of time deficiencies was to produce a curriculum that was too compressed to attain its overall objective. The particular topics and activities that were most severely under-budgeted on time were the following:

> Starting on a Hill--This was very difficult for many students. Time must be allocated, and it must be placed somewhat later in the schedule, where students are more proficient in basic control.
>
> Maintenance--The amount of time allocated was clearly insufficient to cover the range of maintenance tasks included in objectives. The solution appears to be to reduce maintenance objectives to those critical activities that can be readily performed by operators lacking maintenance experience.

Off-Street Laboratory Instruction--The transfer of skills from the on-street to off-street environment was not as great as was anticipated. More time needed to be allocated to the laboratory sessions.

Even with the readjustment of time allocations, it will not be possible for all students to attain performance objectives through scheduled instruction. Nor, is it efficient to adjust the curriculum schedule to the slowest students. Rather, the ability of motorcycle instruction to take place in off-street areas, away from the hazard of traffic, should be exploited by providing slow students with home practice guides that will assist them in catching up with the rest of the class.

Instructional Methods

Several elements of instructional methodology called for in the Specifications proved ineffective. Chief among these are the following:

- Error Demonstration--Instructors were called upon to demonstrate common errors to be avoided by students in range activities. This was proved uninformative and a waste of time.

- Sharing of Motorcycles--Concern for student fatigue led to a recommendation that students share motorcycles in early phases of instruction (many current programs do so throughout instruction). This approach merely deprived students of valuable practice time.

- Rear Distance Judgment--Because of the distortion produced by convex mirrors, rear distance judgment is often inaccurate. This is potentially hazardous. A range activity intended to lead to improved rear distance judgment proved ineffective. Use of visual aids appeared to be more efficient.

- Part Identification--The Specifications called for classroom drills in identification and location of motorcycle parts. It appears better to spread the part identification throughout the course introducing each part in terms of its function.

Instructional Materials

Most of the instructional materials utilized in the course proved highly effective. One that did not was a motorcycle introduced into the classroom as an instructional aid. It was rendered ineffective by the inability of students to see all parts of the motorcycle.

REVISION OF SPECIFICATIONS

Following completion of the Pilot Test, the Preliminary Specifications were revised. The revisions included the following:

1. Detailed description of instructional content and methodology.
2. Organization of the Specifications in terms of one-hour instructional sessions.
3. Revision of requirements to overcome specific deficiencies observed in the Pilot Test.

The revision was extremely extensive. The provision of additional detail was by far the most time consuming aspect of the revision process. While the Final Specifications make little change in the fundamental requirements set forth in the Preliminary Specifications, the two documents bear little resemblance to one another.

Following completion of the revision, the Specifications were disseminated among a subgroup of the original panel for review and comment.1/

1/ Panelists participating in the final review process were Dr. Duane Johnson, Mr. Stuart Munro, Dr. Allen Robinson, and Mr. Robert Rousch. The draft Final Specifications were revised on the basis of comments from the final review panel. The result is the Specifications that appear in Part II of this report.

CONTENT OF SPECIFICATIONS

STRUCTURE OF SPECIFICATIONS

The specifications are organized in terms of Sessions, Lessons, and Units.

Sessions

A "session" is the basic element of a motorcycle safety education course. It represents the material that would be administered in a single meeting of a class. The duration of sessions, as configured in the specifications, ranges from 1 - 1-1/2 hours.

There are five basic categories of sessions:

Classroom--Instruction conducted in a classroom, primarily concerned with information presentation and discussion.

Range--Sessions conducted on a paved surface, primarily intended to provide practice in basic and advanced skills without interference from traffic.

Street--Sessions conducted in the roadway/traffic environment, to provide the monitored practice in interacting with roadway and traffic characteristics.

Area--Sessions conducted in a natural, off-street area, to provide practice in dealing with requirements of the natural environment under controlled conditions.

Trail--Sessions conducted along trails, to provide practice in dealing with the full range of requirements imposed by the natural environment.

Lessons

A lesson is simply a set of sessions which combine to achieve a single set of performance objectives. Only a minority of performance objectives can be achieved in one session. More often, a combination of a classroom session accompanied by one or more laboratory sessions (e.g., range and street, area and trail) is required to achieve a performance objective.

Units

A unit is a collection of lessons dealing with a particular aspect of motorcycle safety. Units constitute the major subdivisions of a motorcycle safety education course. The specifications are divided into the following six basic units of instruction:

- Unit I, Basic Riding Skills--Instruction intended to provide the skills required to control the fundamental motion of the motorcycle.

- Unit II, Street Riding Principles--Instruction intended to provide the knowledge of street riding principles needed to operate safely within the normal roadway/traffic environment.

- Unit III, Street Riding Skills--Instruction intended to provide students with the advanced skills needed to handle the more complex demands of the roadway/traffic environment.

- Unit IV, Motorcycle Maintenance--Instruction intended to provide the skills and knowledges needed to perform the minimum inspection, servicing, and repair needed to keep the motorcycle in safe operating condition.

- Unit V, Off-Street Operation--Instruction required to provide the knowledges and advanced operating skills needed to meet the demands of the off-street (recreational) environment.

- Unit VI, Preparation For Travel--Instruction intended to assure that the operator and motorcycle are adequately prepared for travel.

CONTENT OF SPECIFICATIONS

The content of the specifications includes:

- Purpose
- Objectives
- Content
- Prerequisites
- Methods
- Materials
- Equipment
- Facilities
- Proficiency Assessment Measures

The content of these items as they appear in Course, Unit, Lesson, and Session specifications is summarized in the chart on the following table and described in the following paragraphs.

ITEM	COURSE	UNIT	LESSON	SESSION
Purpose	Purpose of MSE courses	Purpose of unit instruction	Purpose of lesson instruction	Purpose of session instruction
Objectives	N/A	N/A	Performance, knowledge and skill objectives for those sessions which combine to lead to attainment of a single set of objectives	N/A
Content	Units comprising each MSE course; general structural considerations	Lessons and sessions comprising unit	Sessions comprising unit	Topics comprising session
Prerequisites	Prerequisites common to all units	Prerequisites for individual units	N/A	N/A
Methods	General description of instructional methods	General description of application of instructional methods to unit content	N/A	Detailed description of session instructional activities[1]
Materials (student materials, teacher materials, instructional aids)	General description of content and format of instructional materials	General description of the specific types of instructional materials required	N/A	Detailed description of specific items of instructional material
Equipment	Equipment requirements common to all units	Equipment requirements specific to individual units	N/A	Equipment requirements specific to individual sessions
Facilities	Facilities requirements common to all units	Facilities requirements specific to individual units	N/A	Facilities requirements specific to individual sessions
Proficiency Assessment Measures	General description of evaluation measures required throughout the course	Detailed description of evaluation measures by individual units	N/A	N/A

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[1] In Session specifications this item appears last since it makes up the body of the specifications.

Purpose

Each specification is headed by a brief statement of purpose, that is, the general goal to be attained through specified instruction.

Objectives

Instructional objectives are brief descriptions of the performances, knowledges, and skills to be achieved through instruction. They refer to the "real world" end product of instruction, and are not to be confused with the "objectives" that often appear in lesson plans as criteria by which lesson outcomes will be assessed (e.g., the student must be able to describe...).

Instructional objectives appear at the beginning of each lesson. As noted previously, a lesson is simply a set of classroom and laboratory sessions which are combined to attain particular instructional objectives.

Performance Objectives

Performance objectives are descriptions of the real world performance to be achieved. There are two different types of performance objectives--ability-oriented objectives and compliance-oriented objectives.

> Ability-Oriented Objectives--begin with "the student must be able to" and identify performances that the students must be capable of performing by the end of instruction.
>
> Compliance-Oriented Objectives--begin with "the student must" and identify things students can already do. The objective of instruction is to maximize the likelihood that they'll actually be done.

Some objectives are concerned with both enabling a student to perform and assuring that the performance occurs. In these cases "the student must" is used since it is the more inclusive of the two phrases.

Knowledge Objectives

Knowledge objectives begin with the phrase "the student must know..." and identify the information that students must possess in order to meet performance objectives. The most pervasive type of knowledge is procedure, that is, knowledge of the specific behaviors that make up the performances. The procedural objectives are implicit and, therefore, do not appear in the list of knowledge objectives. Rather, knowledge objectives are confined to such non-procedural information as identification, locations, numerical values, relationships, and concepts.

There are two general types of knowledge objectives. One type consists of knowledges that enable students to meet performance objectives; these typically underlie ability-oriented performance objectives. The second type consists of knowledges that play a role in motivating attainment of performance objectives; these typically underlie compliance-oriented performance objectives. No attempt is made to distinguish between the two in the list of knowledge objectives.

Skill Objectives

Skill objectives identify abilities that are needed, over and above knowledge, in order for performance objectives to be attained. They appear in the list of Skill and Knowledge Objectives and begin with the phrase "the student must be able to."

Content

A content outline is provided for each of the specifications. The Course is outlined in terms of the Units that make up a motorcycle safety course. As will be noted shortly, there are several "courses," each one comprising a different combination of Units. The Course specification identifies both the nature of the Units and the way in which they are combined to form various courses.

Content outlines for the remaining specifications are straightforward. Units are outlined in terms of Lessons, Lessons in terms of Sessions, and Sessions in terms of major topics.

Prerequisites

Prerequisites are established for each Unit. A student eligible for any Unit is also eligible for the lessons and sessions that comprise that Unit. While it is expected that students will master the content of one Session or Lesson before moving on to the next, it is not practical to interpose any prerequisites at this level.

Course prerequisites are simply the prerequisites of the Units making up the Course. The only prerequisites that appear in Course specifications are those that are common to all Units.

Methods

Specification of instructional methods at the Session level describes in detail the activities to be carried out by instructors and students. The specification of instructional methods makes up the body of this document.

Specification of method at the Course level consists of a general description of methods employed in the Course, while those at the Unit level involve descriptions of the manner in which methods are applied to Unit content.

Materials

This section of the specifications consists of a description of the materials required to support the specified instructional methods. These instructional materials include the following:

- Teacher Materials--The materials needed to provide guidance to teachers.
- Student Materials--Materials needed by students to prepare for and carry out specified instruction.
- Instructional Aids--Materials including transparencies, films, etc. needed by instructors to assist in teaching activities.

Requirements for instructional materials are specific to individual Sessions and are described in Session specifications. Course specifications describe the general characteristics of various types of instructional materials, while Unit specifications provide a general description of the types of materials required by the particular Unit.

Equipment

Equipment specifications involve descriptions of the hardware items needed to support instruction. These requirements are described in detail as follows:

- Course Specifications--Identify equipment that is required for all instruction.
- Unit Specifications--Identify equipment required in all Sessions of a particular Unit.
- Session Specifications--Identify requirements that are specific to a particular session.

The consolidation of common requirements at the Course and Unit levels is intended to avoid unnecessary repetition.

Facilities

This item identifies requirements for facilities needed in support of instruction, including the following:

- Classroom--Enclosed space where students can sit and where instructional aids may be used.
- Range--An off-street area where students may practice motorcycle operation without interference from traffic.
- Street--Public streets that will allow students to gain practice in handling roadway and traffic characteristics.
- Area--An off-street area consisting of natural terrain and sufficiently open to allow a teacher to observe several students at the same time.
- Trail--An off-street area consisting of natural terrain and vegetation where instructor and students must proceed in single file.

Facilities requirements are identified at Course, Unit, and Session levels in the same manner as Equipment specifications.

Proficiency Assessment Measures

This item identifies requirements for measures capable of assessing attainment of objectives. Some assessment, of course, takes place during the instruction of each Session. However, administration of a formal proficiency measure is a time-consuming activity and can only be justified on a Unit basis. Therefore, detailed requirements for proficiency assessment measures appear in the Unit specifications. The Course specifications provide a general description of the evaluation measures that are used during the Course.

COURSE SPECIFICATIONS

This section of the specifications establishes requirements covering all units and subunits of a motorcycle safety education course. These common requirements apply to structure, prerequisites, instructional method, and instructional support. They include both requirements of a general nature and highly specific requirements that are common to all units.

PURPOSE

The purpose of motorcycle safety instruction, as addressed by these specifications, is to help assure the safe operation of motorcycles. This common purpose underlies all Units of instruction and the Courses that are configured from these Units. It expressly ex̲cludes consideration of mobility, energy conservation, environmental preservation, recreation, or competition. This exclusion is not meant to imply that these concerns should not be included among the goals of motorcycle instruction. It simply means that they are outside the scope of these specifications.

CONTENT

One of the things that distinguishes motorcycle instruction from its automobile counterpart, other than the number of wheels involved, is the great variation in both the background and goals of students. The background experience of students entering instruction may consist of: (1) no riding experience whatsoever, (2) limited riding experience, (3) extensive experience followed by a long lapse, and (4) extensive experience in just one setting (on-road or off-road). The goals of students are equally varied. Some students are interested only in trail riding, others only in street operation. Still others are interested in both.

Motorcycle Safety Education Courses

Any attempt to accommodate the diverse origins and objectives of individual students in a single motorcycle safety education course would inevitably result in many students receiving instruction they do not need or want. This is both uneconomical and deleterious to student interest.

Six courses designed for the major patterns of background and interest appear in the table below. The units that would make up each course are indicated by the placement of an "x" in the appropriate column.

TABLE 1

PROSPECTIVE MOTORCYCLE SAFETY EDUCATION COURSES

COURSE	OBJECTIVE	I Basic Riding Skills	II Street Riding Principles	III Street Riding Skills	IV Maintenance	V Off-Street Operation	VI Preparation for Travel
Basic On-Street	To enable new riders to operate safely in the highway traffic environment	X	X	X	X		X
Basic Off-Street	To enable new riders to operate safely in the off-street (recreational) environment.	X			X	X	X
Comprehensive	To enable new riders to operate in the highway/traffic and off-street environments.	X	X	X	X	X	X
Improvement	To enable inexperienced and former riders to operate safely in the highway/traffic environment.		X	X	X		X
On-Street Transition	To enable experienced off-street riders to operate safely in the highway/traffic environment.		X	X	(X)		X
Off-Street Transition	To enable experienced on-street riders to operate safely in the off-street environment.				(X)	X	X

The Basic On-Street Course is intended to provide all of the instruction required to enable students to operate safely in the highway/traffic environment. The Course consists of all units except Unit V, Off-Street Operation.

The Basic Off-Street Course is the counterpart to the Basic On-Street Course, substituting Unit V, Basic Off-Street Operation, for the two On-Street Units, Units II and III.

The Comprehensive Course is a composite of the On-Street and Off-Street courses and, therefore, includes all units of instruction.

The Improvement Course assumes that experienced students have mastered the basic riding skills at one time or another, and focuses upon the knowledges and higher level skills apt to be lacking among riders who never received formal instruction in (1) safe street operation, or (2) a refresher program.

The On-Street Transition Course consists of the two street riding units (II and III) and those portions of Unit VI involving preparation for street riding. Unit IV is optional, depending upon the student's competence in servicing and repair. Most experienced off-street riders have had to service and repair their own motorcycles through necessity.

The Off-Street Transition Course consists of the Unit V, Off-Street Operation, and portions of Unit VI, Preparation for Travel. Again, Unit IV is optional, depending upon prior experience of students.

There will be few localities with sufficient demand to warrant independent administration of each course. In most instances, the most feasible approach will be to administer all of the instructional units (i.e., the Comprehensive Course) and schedule students into the units as dictated by their abilities. For example, those youthful riders who have had extensive off-street experience, would enter the course at Unit II, Street Riding Principles. Those in the Basic Off-Street Course, upon completing Unit I, would spend a period of time in self-practice before resuming the Course in IV. While this is less than desirable from a learning viewpoint, it is better than not being able to offer the Off-Street Course at all.

Unit Sequence

The sequence in which Units would be introduced in a Course generally parallels the order in which they appear in the specifications.

The priority given to Unit I, Basic Riding Skills, is warranted by the complexity of motorcycle operation. The sooner students begin to acquire the basic operating skills, the higher their proficiency will be within the time available. Starting with Basic Operating Skills is consistent with the interests of students; they are there to learn how to ride. Courses that begin with other subject matter (i.e., history of motorcycles, safety, maintenance) tend to experience a relatively high initial dropout rate.

Street Riding Principles (Unit II) is a natural successor to Basic Riding Skills (Unit I) in an On-Street Course. It is intended to provide information needed to transfer basic riding skills to the arena of highway traffic.

Street Riding Skills (Unit III) is concerned with developing the higher level skills needed to cope with the potential hazards of the highway-traffic environment. It is delayed until after Street Riding Principles to allow additional time for development of basic skills before proceeding to advanced skills.

In an On-Street Course, Maintenance (Unit IV) would be introduced after completion of Unit III. Any maintenance required up to this point can be performed by teachers or support personnel. In an Off-Street Course, however, maintenance would generally precede off-street instruction. This sequence would allow the students to undertake a share of the maintenance burden that occurs as a result of (1) the greater degree of wear and tear caused by the rigors of the off-street environment, and (2) the distance of off-street practice areas from available maintenance facilities.

Off-Street Operation (Unit V) would follow Unit IV. In a Comprehensive Course, off-street instruction would be introduced after completion of the on-street instruction. This sequence will allow students to attain a relatively high degree of operating skill before meeting the challenge of the off-street environment. In an Off-Street Course, however, off-street instruction would follow immediately after Unit I. The rate of progress during laboratory sessions of an Off-Street Course would probably be slower than that found in a Comprehensive Course.

Preparation for Travel (Unit VI) does not involve operation of the motorcycle and can, therefore, fall anywhere in the sequence of instruction. This gives the unit a degree of flexibility that can be employed in solving schedule problems. For example, it can be:

- Paired with an unaccompanied laboratory session (i.e., two laboratory sessions back to back) to provide an alternating class/lab schedule, as described in the next section.

- Used as a substitute for a scheduled laboratory session on rainy days to avoid interrupting the normal schedule.

Session Structure

In order that a Course fit into a high school or college program, sessions have been organized so as to require one hour of instruction. Where Courses are given outside of a regular school program--adult education or community programs--longer sessions are required. Students generally find it inconvenient to travel to and from the instructional site, giving up a portion of an evening or weekend for just one hour of instruction. In this context, two sessions would be combined to form a single class meeting. The duration of the meeting would be two hours, plus whatever time was consumed in traveling between the classroom and laboratory instruction.

To the maximum extent possible, classroom and laboratory sessions alternate with one another throughout the course. The only exceptions are where one laboratory session follows another; no two classroom sessions are scheduled back-to-back. This alternating schedule has two important advantages. First, it achieves the integration of classroom and laboratory instruction that has generally been considered conducive to learning. Secondly, it avoids long periods of uninterrupted classroom instruction, something that tends to result in a loss of student interest (and often the eventual loss of students themselves). The second consideration is particularly important where two sessions are combined to form a single class meeting.

PREREQUISITES

In order to enter any unit of instruction, a student must meet the following prerequisites:

1. Must be able to ride a bicycle--A student who cannot ride a bicycle requires considerably more practice than other students in learning to balance a motorcycle. Allowing such students to enter a course tends to be disruptive of overall class progress. Moreover, such students have an increased likelihood of dropping a motorcycle and causing injury to themselves as well as damage to the motorcycle.

   Non-bike riders should be urged to borrow a bicycle and develop the ability to start it in motion, make turns along the prescribed path, and stop at prescribed locations. They may then enroll in the next scheduled class.

2. Must have the required physical stature and strength--The student must be able to hold the motorcycle in an upright position when it is not moving, and to touch the ground with both feet when seated on the machine. Given the relatively small machines that are used in most training programs, this prerequisite can be met by most normal adults. The primary purpose of the prerequisite is to prevent children from entering a course until they are big enough and strong enough to handle the motorcycle.

METHODS

The methods of instruction are specific to individual class and laboratory sessions and, therefore, appear in the Session specification. In fact, descriptions of the instructional method make up the body of the Session specifications. The following is a summary of the three basic modes of instruction: independent study, classroom and laboratory.

Independent Study

The instructional methods set forth in the specifications assume that students will acquire much of the information that underlies knowledge objectives outside of class through the use of student materials. This approach to information acquisition allows instruction to be more effectively directed toward an interactive form. An additional advantage of independent study as an instructional approach is that it allows students to advance at their own individual pace.

Any doubts as to the effectiveness of independent study involve its acceptance by students rather than the effectiveness of the method itself. Independent study in the form of "homework" has never been popular with students at any level. However, the inherent interest value of the subject matter makes motorcycle instruction a more promising prospect for independent study than most other subjects. The extent to which this promise is fulfilled will depend upon the degree to which the instructor encourages independent study by (1) requiring students to review and apply information in the classroom rather than simply giving it to them, and (2) making satisfactory preparation through independent study a prerequisite for operation of the motorcycle.

Classroom Instruction

Classroom instruction involves the following instructional methods:

Discussion--A teacher-moderated student discussion of motorcycle related issues based upon information previously acquired.

Informational Presentation--The simple presentation of information to students by the teacher (i.e., lecture) or through audiovisual media.

Review--The questioning of individual students as a means of reviewing information.

Problem Solving--The application of previously acquired information to the solution of hypothetical problems formulated by the instructor, with or without the aid of instructional media.

The specifications for classroom instruction make extensive use of interactive methods--review, problem solving, and discussion--and make little reference to information presentation. This emphasis upon interactive methods is based on the premise that it is not cost effective to hold a class simply to present information that students can acquire on their own time and at their own learning rate. In an experiment described earlier, the use of interactive approaches led to significantly greater learning. The specifications call for information presentation only where availability of appropriate independent study materials has not been established.

Even where appropriate independent study materials are available, their ability to provide the necessary information depends upon (1) student access to the materials, (2) the willingness of students to read the material, and (3) the willingness and ability of instructors to reinforce use of independent study materials through appropriate application of interactive methods. Where these conditions cannot be fulfilled, information presentation will have to replace the "review" called for in the specifications. The content would remain the same.

Laboratory Instruction

All instruction that involves actual operation of the motorcycle by the student is grouped under the heading of "laboratory instruction." Such instruction takes place in the Range, Street, Area, and Trail locations described under "Facilities." Instruction in each of these areas involves a somewhat different set of methods.

Range and Area instruction are similar in that the instructor directs up to six students in performing a set of exercises which are designed to achieve a specific objective. In carrying out these exercises, the following methods are employed:

- Instructor Demonstration--A demonstration by the instructor of the way an activity is to be performed. Where possible, individual students are called upon to give directions to the instructor. This allows the students to become involved in the activity even though they lack the skill to perform it themselves.
- Student Demonstration--Individual student performance of an activity under the direct supervision of an instructor.
- Student Practice--Group performance of an activity under the general supervision of an instructor.

Street and Trail instruction are similar in that they involve an instructor directing the activities of up to three students in operating the motorcycle over a prescribed route. The nature of the activities will depend upon the environment which exists along the route. The instructor observes students, analyzes their deficiencies, and provides corrective instruction.

Specification of Method

In the case of Classroom sessions, the specification of instructional method consists of a detailed outline of instructional content. No attempt is made to describe specific learning activities since they involve merely the application of common instructional approaches--presentation, review, discussion, and problem-solving--to the content that is identified. In other words, the only aspect of instructional method that is unique is the content.

The activities involved in Laboratory instruction, on the other hand, are totally unique to motorcycle instruction. For that reason, they are described in detail.

Range and Area sessions consist of a series of individual exercises. The specification of the instructional activities that constitute each exercise is structured as follows:

(1) Purpose--A brief statement of the purpose to be served by the exercise.

(2) Range/Area Layout--A description of the physical layout required in order to conduct the exercise. Where the layout involves any degree of complexity, the description is accompanied by a diagram. The diagrams are only illustrative and should not be considered as representing requirements.

(3) Exercise Procedure--A description of the student and instructor activities that are required in carrying out the exercise.

(4) Operating Procedures--A description of proper motorcycle operating procedure as it relates to the activities called for in the exercise. Operating procedures differ from exercise procedures in that they represent procedures that are employed any time a motorcycle is operated and not those that are carried on solely for instructional purposes.

(5) Instructional Points--Aspects of student performance that are to be observed for instructional purposes. In theory, any element of operating procedure is a potential instruction point. However, there is a limit to what an instructor can effectively observe. The instruction points identified in the Specifications are confined to those elements of performance that are (a) most likely to be the source of student error, (b) most critical to operating safety, and (c) relatively unique to the exercise being performed.

(6) Method--Additional items of instructional methodology that are not included in the above categories. The most common examples are:

   (a) Instructional Approach--Which elements of general instructional approach are involved, e.g., whether or not an instructor demonstration is required.
   (b) Diagnostic Aids--Suggestions as to the way operator errors can be diagnosed from various aspects of vehicle performance.
   (c) Safeguards--Particular precautions are to be employed in carrying out the exercise.

Street and Trail sessions do not consist of individual exercise, but rather represent one continuous activity. Nevertheless, the instructional method is capable of being described in the same general terms as Range and Area sessions. The only difference between the two is the replacement of "Range/Area Layout" by the following:

(2) Route Requirements--A description of the characteristics of on-street routes and off-street trails over which students and instructor are to operate during the session.

Instructional materials consist of student materials, teacher materials, and instructional aids.

Student Materials

The following requirements for student materials apply to all units and sessions:

Instructional Content--Materials capable of communicating the informational content required to attain Course objectives include:

- A textbook or handouts containing information appropriate to session knowledge objectives.
- Owner's manuals containing information specific to individual vehicles used in the course.

Instructional Guidance--Information capable of guiding students through learning materials include:

- Procedures for conducting home practice exercises, including selecting exercise areas, carrying out self-practice activities, and assuring safety to the operator and others.
- Range and area exercises and layouts.
- Street routes for on-street instruction.

Administrative Information--Materials identifying the student's Course responsibilities include:

- Course outline and schedule.
- Rules of behavior during laboratory instruction.
- License and permit requirements.
- Individual equipment requirements, including protective gear.
- Waivers of liability.

Reference Information--Information referring students to such valuable sources of information as:

- Texts, periodicals, and other materials for self-improvement.
- Service manuals and other publications.

- State and local laws governing on-street and off-street operations.

- Lists of recreational areas.

Teacher Materials

Regardless of the type of Session, or the method of instruction to be employed, the instructor requires some form of guidance, (e.g., a "lesson plan" or "lesson guide "). The guidance must be sufficiently detailed to allow fully qualified teachers to apply the selected instructional methods effectively. The specifications assume that instructors are knowledgeable in both motorcycle operation and general instructional methodology. Guidance is therefore restricted to that needed by teachers to cope with the novel requirements of content and method imposed on Session instruction.

To provide adequate guidance, instructor materials must include the following:

- Instructional objectives to be attained (identified for lessons rather than individual sessions).

- The instructional aids, student materials, training equipment, and tests that will be required for session instruction.

- A detailed outline of instructional activities including:

    Instructor activities.
    Student activities.
    Time allocated to activities.
    Use of instructional aids.
    Administration of tests.

Instructional Aids

Requirements for instructional aids are divided into two basic categories:

Static--Aids that do not involve motion, including transparencies, slides, filmstrips, handouts, and classroom charts.

Dynamic--Visuals that are capable of depicting motion, including motion pictures, videotapes, and rapid sequences of slides or filmstrips.

Dynamic aids are called for whenever the information to be communicated involves motion. If motion is not involved, static visuals are specified. It should be understood that any requirements for static visuals could also be fulfilled by dynamic visuals. The reverse would not be true.

There are no requirements as to what type of static or dynamic visuals will be employed (i.e., slides vs. filmstrips). The choice will depend upon the availability of materials and the ability of host agencies to afford them.

Where appropriate, requirements for static and dynamic visuals are further classified as follows:

- Pictorial--Pictures of actual things.
- Graphics--Representations of relationships, concepts, etc.

EQUIPMENT

The items of equipment required for the Course are operational motorcycles, protective gear, vehicle parts and supplies, range support equipment, communication equipment, and classroom equipment.

Operational Motorcycles

Operational motorcycles used for laboratory instruction must meet the following requirements:

(1) Number--One motorcycle should be provided for each student up to a maximum of 12. Except for the first session where paired student activity is required, any other requirement for sharing motorcycles will retard progress. One motorcycle should be available for instructor demonstrations and one for use if one of the students' motorcycles malfunctions.

(2) Size--Motorcycles should be no smaller than 90 cc. and no larger than 200 cc. Motorcycles that are too small do not allow development of appropriate operating skills. On the other hand, motorcycles that are too large may complicate the learning task.

(3) Style--A combination (street/trail) motorcycle would meet requirements of all units although a street bike would suffice in courses that don't involve off-street instruction. No mini-bikes, step-through, or automatic transmission motorcycles should be used.

(4) Tires--Universal tires will meet requirements for all instruction. In courses without off-street instruction, tires with street treads would be acceptable. Full "knobbies" should not be used since they will impair the motorcycle's handling characteristics on hard surfaces during Range and Street instruction.

(5) Accessories--Requirements for accessories are specific to individual units and are described in Unit specifications.

(6) Administrative Requirements--Motorcycles should meet administrative requirements appropriate to areas of operation. Specific requirements are identified in Unit specifications.

(7) Liability Insurance--Insurance must be provided for protection of the sponsoring agency.

Protective Gear

The following requirements for protective gear apply throughout the course. Requirements may be fulfilled, totally or in part, by the host agency or the individual students. Additional requirements appear in Unit specifications as appropriate.

(1) Helmets--Students must have helmets having the following characteristics:

- Meet State, ANSI, Snell, or DOT standards.
- Suitable fit; if helmets are supplied by the host agency, the number of helmets should exceed the number of students by 50% and should include all sizes in order to assure each student a proper fit.
- Individual helmets; switching helmets is time consuming and becomes unpleasant on warm days due to the accumulation of perspiration.

(2) Eye/Face Protection--Face shields or goggles are required for eye protection. Sunglasses or prescription glasses do not offer sufficient protection.

(3) Jacket and Trousers--Arms and legs must be covered to provide protection in the event of a fall.

(4) Shoes--Foot protection must meet the following requirements:

- Full shoes or boots (e.g., no sandals).
- Leather or heavy synthetic (e.g., no fabric).
- A heel of sufficient height to prevent foot from slipping off foot pegs.
- No rings or loose laces that could catch on the motorcycle.

(5) Gloves--Leather gloves should be required regardless of the time of year.

Vehicle Parts and Supplies

The following spare parts and supplies are required:

(1) Gasoline

(2) Gasoline cans

(3) Funnels

(4) Engine and transmission oil

(5) Spark plugs (for slow running)

(6) Distilled water (for batteries)

(7) Tire pump or compressed air supply

(8) Tire gauges

(9) Clutch and brake cables and levers

(10) Tools--both metric and non-metric where not supplied with motorcycles

(11) Oil and cleaning rags.

Range Support Equipment

The following items of equipment are required in support of Range sessions throughout the course:

(1) Markers--Traffic cones or other markers are needed to identify key points and paths of travel for Range exercises. The number will vary as the function of class size and the extent to which painted surface markings are used.

- Small cones, 6" or less in height, to delineate paths of travel in the presence of painted markings, (halves of tennis balls may also be used).
- Large cones, 12" or more in height, or flags inserted in the tops of small cones to identify key points (e.g., starting and stopping points).

(2) Safety Equipment--The following items of safety equipment are required:

- First aid kit containing antiseptic, gauze, and ointment for burns or abrasions.
- Fire extinguishers, at least 2-1/2 pounds, dry chemical.

(3) Broom.

Communication Equipment

The use of radio equipment to help instructors communicate with individual students will enhance the effectiveness of laboratory instruction. It is particularly valuable during Street sessions as it allows instructors to ride at the rear of a formation (to observe all students), yet maintain communication with lead students. To be effective, radio communication equipment should meet the following requirements:

(1) Instructor Transmitter:

- "Boom" mike extending from the helmet.
- An activation switch located on the left handlebar.
- Noise suppression in the transmitter to prevent motorcycle engine noise from interfering with the instructor's message.
- FM circuitry to prevent electrical interference.

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(2) Student Receiver--(Students need not be provided with transmitters):

- A lightweight receiver that may be worn by the rider or readily removed from the motorcycle to prevent theft.
- An inside-helmet earphone.

(3) Legal Requirements--Comply with all Federal requirements governing the power, range, and licensing of transmitters. At the present time, the cost of units meeting these requirements tends to preclude their widespread use in motorcycle safety education courses. However, where the cost can be borne, they greatly enhance effectiveness of instruction.

Classroom Equipment

Classroom equipment requirements include an overhead projector, slide projector, film strip projector, and motion picture projector (depending on the particular Instructional Aids used in meeting specified requirements).

FACILITIES

The following requirements relate to instructional facilities applied to the entire Course.

Classroom Facilities

Requirements for classroom facilities do not differ from those of other instructional programs. Requirements are as follows:

(1) Sufficient size to accommodate the maximum number of students.

(2) Seating for all students.

(3) The ability to be darkened for the use of Instructional Aids.

Where combined classroom/laboratory sessions are scheduled, the classroom space should be as close to range facilities as possible to minimize travel time. (It is often easier to find classroom space near suitable range facilities than vice versa).

Storage Facilities

A storage area close to the range should be available. It should offer protection against bad weather, theft and vandalism. The storage area should have sufficient space to allow clearance between motorcycles which will help to protect gas tanks, mirrors and cables when the motorcycles are moved.

All tools, cones, etc. should be stored on shelves so as to avoid cluttering the floor.

Range Facilities

If possible, off-street range facilities should be provided for laboratory instruction in Units I-III. Range instruction offers the following benefits:

- Economy--An instructor can effectively handle several students at one time.
- Safety--Control may be exercised over roadway and traffic conditions to protect students from possible hazards arising from these sources.
- Control of Learning--The instructor can regulate the complexity of roadway and traffic conditions in terms of the rate of student learning.

Range facilities should meet the following requirements:

(1) Size--The dimensions of the range area should be at least 75' x 100' to permit students to attain necessary operating speeds. If classes involving more than six students are scheduled, the minimum range dimensions should be at least 100' x 200'.

These specifications will assume a class size of 12 students. Illustrations will therefore make use of the larger range area.

(2) Surface--The surface should be paved and free of broken pavement, dirt or gravel (except where called for in range sessions).

(3) Grade--The range area should be level except as follows:

(a) A slight incline at one end of the area will aid in moving the motorcycle during unpowered operation (Unit I).

(b) A small hill near the periphery of the range may be utilized in instruction concerned with starting on a hill (Unit II) and skid recovery (Unit III). Additional requirements will be detailed in Unit specifications.

(4) Surroundings--The area surrounding the paved range should have one of the following:

(a) Fence--If possible, the range should be surrounded by a fence in order to isolate students from surrounding vehicular and pedestrian traffic.

(b) Buffer Zone--In the absence of a fence, there should be a buffer zone of at least 20' from surrounding structures and 30' from adjoining roads.

(c) Isolation from homes or office buildings.

(5) Recovery Area--If the longest dimension of the range is less than 200', the area adjacent to either end of the range should be free of obstructions so as to serve as a recovery area from maneuvers performed at the higher speeds (15-20 mph).

(6) Painted Markings--If possible, commonly used paths of travel should be marked with painted lines approximately 3" wide. The following layout is suggested:

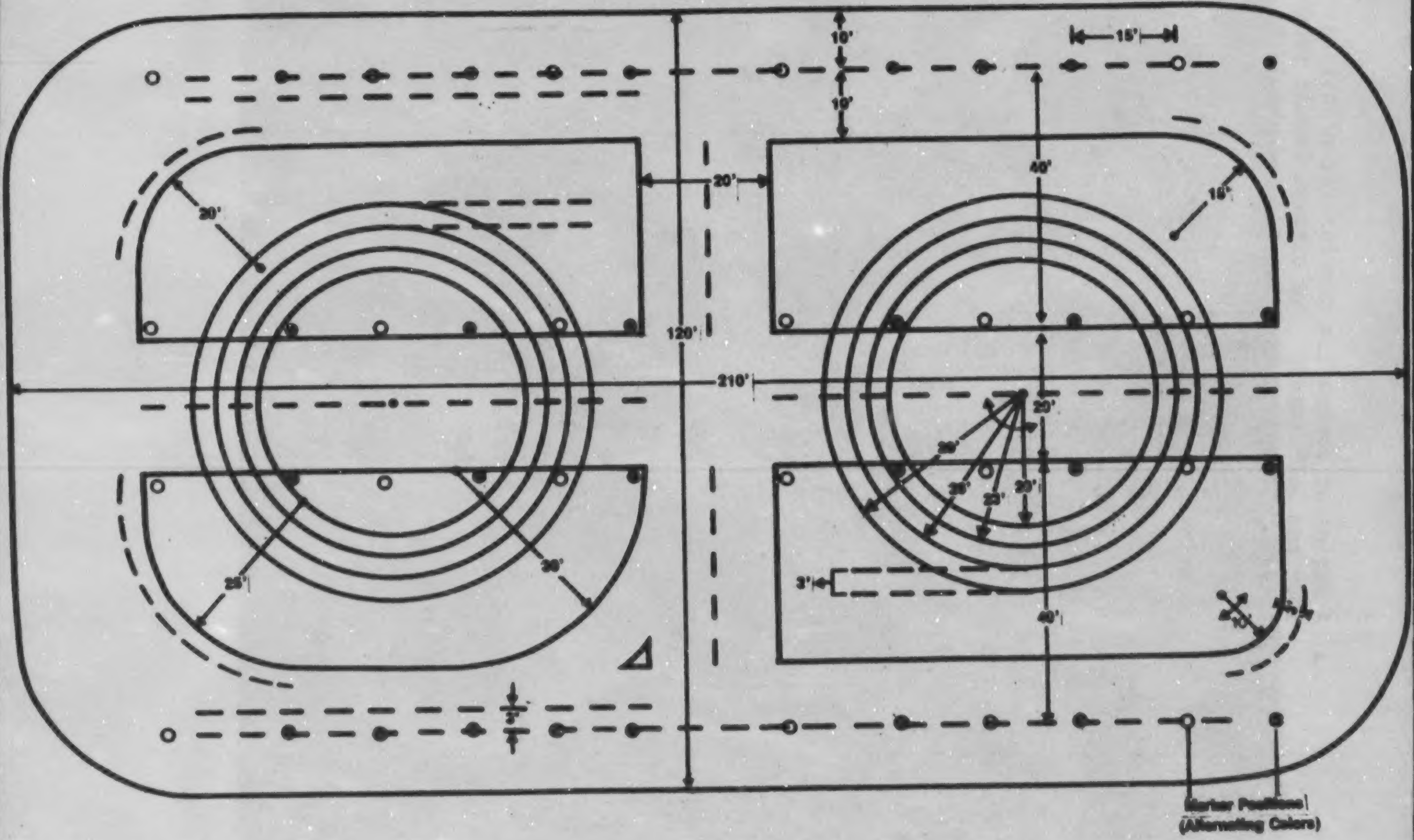
- A roadway on the periphery of the paved area, consisting of two lanes no less than eight feet wide.
- Cross-streets running the width and length of the range area providing "T", "+" and "merge" type intersections.
- One or more straight paths to be used for practice in braking and straightline balance. The paths should be approximately 50' in length and approximately 3' in width.
- A series of 90° curves for use in practicing turns. The radii of the curves should range from 10' to 30' and be approximately 3' wide.

- A series of concentric circles for practicing 180° and 360° turns. The circles should range between 40' and 60' in diameter and should be approximately 3' in width.

(7) Cone Positions--If possible, the positions of traffic cones used in exercises should be indicated by small painted marks to aid instructors, assistants, or students in proper positioning of cones. Color codes may be used to indicate different exercises.

An example of a range area meeting the above requirements appears on the following page.

Basic Range Diagram


10'
15'
10'
20'
40'
15'
20'
120'
210'
20'
30'
25'
22'
20'
25'
30'
3'
40'
10'
3'
Marker Positions
(Alternating Colors)

PROFICIENCY ASSESSMENT MEASURES

Some assessment of proficiency is required as a part of each instructional unit. In the case of individual students, assessment measures help to evaluate student progress and indicate the eligibility for advanced instruction. Collectively, the results furnished by assessment measures provide an evaluation of the curriculum and the quality of its administration.

Types of Measures

Two types of measures are provided for in the specification: knowledge measures and performance measures.

Knowledge Measures

Knowledge measures are required as a means of assessing student acquisition of information through Independent Study and Classroom instruction and, hence, readiness for Laboratory instruction. Administration of a knowledge measure also provides an incentive to individual students to acquire information through these sources.

Requirements governing the construction of knowledge measures are the same as those that apply to any knowledge test; namely, that they be constructed to meet the following conditions:

(1) Individual items must be constructed in a way that individuals possessing specified information will answer correctly, while those who do not possess the information will have only a chance probability of answering correctly.

(2) Each measure must constitute a sample of information that is representative of the totality of knowledges contained in Unit objectives.

(3) Each measure must include a sufficient number of items to provide a reliable estimate of the degree to which knowledge objectives have been obtained.

Performance Measures

A measure capable of assessing attainment of performance objectives must be administered for each Unit. The performance measure must be designed to permit assessment of the students' attainment of skill objectives and those knowledge objectives that cannot be validly assessed through knowledge measures. In order to achieve this goal, a performance measure must:

(1) Create situations requiring application of specified skills and knowledges.

(2) Provide a means of observing, in an objective fashion, those aspects of performance that reflect attainment of skills and knowledges.

(3) Provide an evaluation system that reflects the degree to which skill and knowledge objectives have been attained.

Form of Measure

The form of the proficiency measurement system may range all the way from an informal subjective appraisal of proficiency arising from teaching activities to a highly formal "test" administered outside of instruction. On the basis of current evidence, it is not possible to specify either form of assessment as a requirement. Considerations influencing any decision as to the type of assessment process to be adopted include the following:

Time--Administration of a test, particularly a performance test, consumes time that might otherwise be devoted to instructional activity. In a compressed course schedule, it may not be possible to both attain the objectives and provide an objective measure of attainment. On the other hand, with ample time available, separate administration of a formal test would be more feasible.

Instructor Capability--The ability of an instructor to obtain a valid assessment of proficiency will also influence the selection of an approach. An instructor who is capable of appraising proficiency during the instructional process may be able to provide a more valid assessment than a formal test. On the other hand, an instructor who lacks this ability may need a test not only for the assessment process itself but to justify to individual students any actions that are taken as a result of assessment (e.g., refusing entry into on-street instruction).

PERSONNEL REQUIREMENTS

Personnel requirements may be divided into three categories; Instructional, Instructional Support, and Maintenance.

Instructional Personnel

The number of instructors required to teach a Course will depend upon the number of students involved. Instructor requirements will therefore be addressed in terms of the student-instructor ratio.

Classroom Instruction

Generally speaking, for classroom instruction, a student-instructor ratio of approximately 25-1 is considered optimal. Larger numbers prevent use of interactive methods, while smaller numbers become too costly.

In an integrated class/laboratory schedule, it may be necessary to limit classroom instruction to 12 students, so that laboratory sessions, which cannot accommodate more than 12 students at a time, can keep pace. This need is greatest in combined class/laboratory sessions. If students are to proceed directly from classroom into laboratory instruction, both must involve the same number of students.

Range/Area Instruction

Experience in administering motorcycle Range instruction points to a 6-1 student-teacher ratio as being optimal. The same ratio appears to apply to the Unit V counterpart, Area instruction. A larger number of students exceeds the instructor's span of control, while a smaller number becomes too costly.

Where the number of motorcycles and the size of the facilities permit, two classes may be run simultaneously. This offers two potential advantages. First, it allows use of a two-man instructional teaching staff consisting of a chief instructor and an assistant instructor. This is less costly than using two fully qualified instructors, something that would be necessary if the classes were taught independently.

The second advantage is that it increases the flow of students through Range instruction. With Range classes of only six students, it would take four Range sessions to accommodate the output of each (25 student) Classroom session. This could force a substantial delay between Classroom and Range instruction.

The way the specifications are written, they assume that classes will consist of 12 students each, and be administered by a chief and an assistant instructor.

Street/Trail Instruction

On-street instruction is generally believed to require one instructor for every three students. Given the inter-vehicle separations required in street operation, it becomes almost impossible for an instructor to observe more than three students. Furthermore, as the number of students increases, the chances of the class getting separated--and perhaps lost--begin to reach certainty. The same 3-1 student-instructor ratio also applies to instruction conducted on trails for largely the same reasons.

The relatively small student-instructor ratio of street/trail instruction (as compared with the range/area instruction) can be offset in one of two ways:

1. Increase the number of instructors and, thereby, maintain total class size.

2. Schedule two street/trail sessions for each range/area session.

The specifications assume a 3-1 student instructor ratio. However, no assumptions are made as to the duration of each class since the nature of the instructional requirements is largely independent of the duration of the classes.

Instructional Support

If the motorcycles are adequately maintained, an instructor should be able to handle the prescribed number of students without assistance. However, the availability of an assistant would be most beneficial in performing the following activities.

- Checking on the operating status and fuel supply of motorcycles, and performing minor servicing as necessary.

- Setting up range facilities, including positioning of traffic cones.

- Assisting students in handling minor problems, e.g., balky engines.

- Performing minor, on-the-spot-servicing, e.g , replacing fouled plugs.

- Performing routine administrative chores, e.g., running errands or taking attendance.

The addition on an assistant is likely to be most feasible in larger classes where an assistant serves more than one instructor.

Maintenance Personnel

Effective maintenance is essential to the success of laboratory instruction. A combination of low operator skill, slow vehicle speeds, and small size motorcycles tends to result in a continuing need for servicing and repair. One of the leading causes of lost instructional time is inoperable equipment.

MOTORCYCLE SAFETY EDUCATION CURRICULUM STRUCTURE

An outline of the structure of the Motorcycle Safety Education Curriculum set forth in these specifications appears on the following page.

MOTORCYCLE SAFETY EDUCATION CURRICULUM STRUCTURE

UNIT I - BASIC RIDING SKILLS
- Lesson 1 - Introduction to Motorcycle Operation
  - Session 1 - Introduction to Motorcycle Operation (Classroom)
  - Session 2 - Putting the Motorcycle in Motion (Range)
  - Session 3 - Maintaining Balance and Direction (Range)
- Lesson 2 - Basic Maneuvers
  - Session 1 - Basic Maneuver Procedures (Classroom)
  - Session 2 - Basic Maneuver Skills (Range)
  - Session 3 - Proficiency Development (Range)

UNIT II - STREET RIDING PRINCIPLES
- Lesson 1 - Seeing and Being Seen
  - Session 1 - Seeing: Principles (Classroom)
  - Session 2 - Being Seen: Principles (Classroom)
  - Session 3 - Seeing and Being Seen: Application (Range)
- Lesson 2 - Responding to Traffic Characteristics
  - Session 1 - Responding to Traffic Characteristics: Principles (Classroom)
  - Session 2 - Responding to Traffic Characteristics: Application (Range)
- Lesson 3 - Responding to Roadway Characteristics
  - Session 1 - Responding to Roadway Characteristics: Principles (Classroom)
  - Session 2 - Responding to Roadway Characteristics: Application (Range)
- Lesson 4 - Street Riding Strategies
  - Session 1 - Street Riding Strategies: Principles (Classroom)
  - Session 2 - Beginning Street Riding (Street)
  - Session 3 - Intermediate Street Riding (Street)

UNIT III - STREET RIDING SKILLS
- Lesson 1 - Motorcycle Related Skills
  - Session 1 - Motorcycle Related Skills: Procedures (Classroom)
  - Session 2 - Motorcycle Related Skills: Skill Development (Range)
- Lesson 2 - Roadway-Traffic Related Skills
  - Session 1 - Roadway-Traffic Related Skills: Procedures (Classroom)
  - Session 2 - Roadway-Traffic Related Skills: Collision Avoidance (Range)
  - Session 3 - Roadway-Traffic Related Skills: Obstacle Surmounting (Range)
  - Session 4 - Advanced Street Riding (Street)

UNIT IV - MAINTENANCE
  - Session 1 - Inspection (Range)
  - Session 2 - Servicing (Range)

UNIT V - OFF-STREET OPERATION
- Lesson 1 - Basic Off-Street Operation
  - Session 1 - Basic Off-Street Operating Principles (Classroom)
  - Session 2 - Basic Off-Street Operating Skills (Practice Area)
  - Session 3 - Basic Trail Riding (Trail)
- Lesson 2 - Intermediate Off-Street Operation
  - Session 1 - Intermediate Off-Street Operating Principles (Classroom)
  - Session 2 - Intermediate Off-Street Operating Skills (Practice Area)
  - Session 3 - Intermediate Trail Riding (Trail)

UNIT VI - PREPARATION FOR TRAVEL
  - Session 1 - General Preparation for Travel
  - Session 2 - Preparation for Off-Street Travel

UNIT I. BASIC RIDING SKILLS

PURPOSE

The purpose of this Unit is to enable students to control the motion of the motorcycle to a level of proficiency that is needed before on-street practice may be safely initiated.

CONTENT

Lesson 1 - Introduction to Motorcycle Operation

Session 1 - Introduction to Motorcycle Operation (Classroom)
Session 2 - Putting the Motorcycle in Motion (Range)
Session 3 - Maintaining Balance and Direction (Range)

Lesson 2 - Basic Maneuvers

Session 1 - Basic Maneuver Procedures (Classroom)
Session 2 - Basic Maneuver Skills (Range)
Session 3 - Proficiency Development (Range)

PREREQUISITES

Prerequisites for this Unit are the same as for the Course.

METHODS

This Unit places primary emphasis upon student practice in Range Sessions. Classroom instruction is limited to that necessary to prepare students for Range instruction. With this restriction, it has been possible to confine preliminary classroom instruction to a single session, thus allowing students to begin riding during their second session. In a combined session schedule, students would have an opportunity to ride during their first meeting. As noted in Course specifications, lengthy preliminary classroom instruction tends to result in a loss of student interest, often accompanied by a high dropout rate.

MATERIALS

Student Materials

Student materials required in support of Unit I instruction include the following:

65

Instructional Content--Requirements for text and handout materials were identified in Course Specifications. The only unique requirement is the need for a mechanism to distribute materials in advance of the first class to allow time for the necessary preparation. Materials may be distributed along with registration materials at the time of enrollment or through the mail.

Instructional Guidance--Guidance materials would describe exercises that could be carried out in off-street areas (e.g., parking lots) to develop proficiency in carrying out basic control tasks, including the following:

(1) Coordinating corrections.

(2) Performing turns of various radii.

(3) Controlled braking and stopping.

(4) Shifting.

(5) Turning while shifting or braking.

Administrative Information--Except for students enrolled in Transition and Improvement Courses, administrative materials would be distributed as part of Unit I.

(1) Course outline and schedule providing the following:

    (a) List of instructional sessions for the course in which the student is enrolled.

    (b) General subject matter of each session.

    (c) The date, time and location of each session.

(2) Course regulations covering behavior during range instruction including the following:

    (a) Protective gear requirements.

    (b) Operating areas and speeds.

    (c) Instructor communications, including hand signals.

    (d) Inter-vehicle separation.

    (e) Emergency procedures (motorcycle malfunctions, confusion, hazardous conditions).

(3) Legal requirements relative to obtaining instruction permits for on-street sessions should be provided at the outset including copies of applications. Some States require a week or more to process permit applications.

Instructional Aids

Instructional aids required in this Unit consist largely of the following:

Static visual aids depicting:

- Location and identifying characteristics of parts involved in operation of the motorcycle.
- Forces involved in performing a coordinated turn.

Dynamic visual aids illustrating procedures for moving (manually), starting, and controlling the motorcycle.

EQUIPMENT

The instructional equipment requirements identified in Course specifications apply to this Unit. However, the following exceptions may be taken to requirements for operational motorcycles:

Style--A street motorcycle may be used instead of a combination street/trail machine.

Tires--Standard street tread may be used instead of universal tread.

Legal Requirements--Since this unit involves no on-street operation, motorcycles need not be registered nor need they be insured for street operation.

FACILITIES

Facilities requirements identified in Course specifications apply to this Unit. Additional requirements are specified in Session II-2-3 "Proficiency Development."

PROFICIENCY ASSESSMENT MEASURES

A Basic Skills Measure should be administered to assess each student's ability to control the balance, speed, and direction of the motorcycle.

The general considerations described under Course Specifications, apply to the administration of a Basic Skills Measure.

Content of Measure

The Basic Skills Measure should provide a measure of the student's attainmant of Unit skill objectives. At a minimum, it should assess the following skills:

1. Coordination of clutch and throttle to put the motorcycle in motion.
2. Coordination of steering and weight distributions to maintain balance and control direction along a straight path, both at moderate and low speeds.
3. Precise use of front and rear brake to perform a controlled stop at a predetermined point.
4. Coordination of steering and distribution of weight to maintain balance and control direction in a curved path.
5. Coordination of the throttle, clutch, and shift lever in order to upshift and downshift smoothly.

On-Street and Comprehensive Courses

A basic riding skills test may be used in an On-Street or Comprehensive Course to determine whether the students are sufficiently proficient to be exposed to the hazards of actual traffic. In such an application, it should be scheduled for administration immediately prior to the first on-street Session of Unit II in order to allow the benefit of Unit II range instruction to be reflected in test performance.

Off-Street Instruction

Because of the danger of the off-street environment, the need to demonstrate proficiency in basic riding skills is less than would be the case in an On-Street Course. The test would be administered at the end of Unit I to allow students lasking in proficiency to gain additional practice before Unit V instruction commences.

Improvement and Transition Courses

A basic riding skills test may be used in an Improvement or Transition Course to determine whether students should be permitted to by-pass Unit I instruction. THis test application is further discussed in connection with Unit II Prerequisites.

UNIT	LESSON	TITLE
I	1	Introduction to Motorcycle Operation

PURPOSE

The purpose of this Lesson is to (1) introduce students to motorcycle operation, (2) provide an overview of the motorcycle safety education program, and (3) develop those knowledges and skills needed by students to prepare the motorcycle for operation and put it in motion.

OBJECTIVES

Performance Objectives	Knowledge and Skill Objectives
NON-POWERED OPERATION	
Moving the Motorcycle--The student must be able to remove the motorcycle from its stand and move it to a suitable location for instruction, without allowing it to fall.	The student must know the proper positioning of the cyclist and motorcycle for moving the motorcycle manually.
Mounting/Dismounting--The student must be able to mount and dismount correctly, without losing balance, and prevent the motorcycle from falling or rolling.	The student must be able to maintain the motorcycle in an upright position while transferring weight during mounting and dismounting.
Balance--The student must be able to balance the motorcycle while operating in a straight line.	The student must be able to control steering and weight distribution so as to maintain balance.
POWERED OPERATION	
Preparation for Starting--The student must be able to prepare the engine for starting by placing the fuel valve, choke, ignition, kill switch (where supplied), and shift lever in a proper position.	The student must know the location and proper operation of fuel valve, choke, ignition, kill switch, and controls, including brakes, throttle, clutch, and gear shift lever. The student must know the differences among common types of motorcycles with respect to part location and operation.

Performance Objectives	Knowledge and Skill Objectives
Kickstarting--The student must be able to start the engine by manipulating the kickstarter (or starter button), throttle, and clutch, and to keep the motorcycle in the proper position.	The student must know common gear patterns. The student must be able to kick downward with enough force while keeping the motorcycle in a stable position.
Accelerating in First--The student must be able to shift the motorcycle into first gear, put it in motion, and bring it to a stop without stalling the engine.	The student must be able to engage the clutch in first gear and to coordinate the clutch and throttle so as to put the motorcycle in motion. The student must be able to apply the brake(s) to bring the motorcycle to a stop.
Maintaining Balance--The student must be able, while in first gear, to steer in a straight path without putting either foot down, and to prevent deviation from the intended line of travel.	The student must be able to coordinate steering and weight distribution so as to maintain balance in a straight path while performing the "stop/start" exercises.
Speed--The student must be able to maintain a steady speed through proper throttle adjustment.	The student must know which way to turn the throttle to attain the desired speed. The student must be able to adjust the throttle to maintain a steady speed.

SHUTDOWN

Shutdown--The student must shut down the motorcycle by turning off the ignition, closing the fuel valve, and making sure all lights are off.

Securing the Motorcycle--The student must secure the motorcycle by placing it on the side stand, and putting it in first gear.

Performance Objectives	Knowledge and Skill Objectives
ADMINISTRATIVE REQUIREMENTS	
Administrative Requirements--The student must be able to fulfill all administrative requirements including completion of independent study assignments, attendance at all instructional sessions, and adherence to administrative requirements governing activity in classroom, in simulation, on the range, and when operating in a street and off-street environment.	The student must know course objectives, course schedule, course assignments, student responsibility covering all modes of instruction and general policies and practices relating to use of instructional equipment and facilities, and communication procedures (e.g., instructional hand signals).
Legal Requirements--The student must fulfill all legal requirements including obtaining licenses, and must conform to school policies.	The student must know license and permit requirements of the State in which instruction is given.

CONTENT

The above objectives are met through:

(1) Introduction to Motorcycle Operation (Classroom)

(2) Putting the Motorcycle in Motion (Range)

(3) Maintaining Balance and Direction (Range)

MOTORCYCLE SAFETY EDUCATION PROGRAM

UNIT	LESSON	SESSION	TITLE	MODE
I	1	1	Introduction to Motorcycle Operation	Classroom

PURPOSE

The purpose of this Session is to (1) introduce the student to motorcycle operation, (2) provide an overview of the Motorcycle Safety Education Program, (3) acquaint students with Course requirements, and (3) describe the procedures involved in preparing the motorcycle for operation and putting it in motion.

CONTENT

This session consists of the following topics:

1. Introduction to Motorcycling
2. Course Overview
3. Preparing for Operation
4. Starting the Engine
5. Putting the Motorcycle in Motion
6. Course Requirements
7. Range Preparation

In paring preliminary classroom preparation down to a single session, a number of topics customarily included in the first classroom session have been deferred until later lessons. These include the following:

- Minor starting and shifting problems.
- Lights and signals.
- Starting on an incline.
- Preoperative inspection.
- Protective gear.
- Vehicle security aids (e.g., fork lock, center stand).

Under the recommended scheduling pattern, those topics assigned to Unit VI would be introduced very early in the course.

MATERIALS

Intructional Aids

Instructional aids for this Session include the following:

Static Visuals

Parts Location Diagram--A diagram showing the location of those parts, and only those parts, involved in starting and controlling the motorcycle.

Dynamic Visuals

Moving the Motorcycle--The procedures involved in manually moving the motorcycle, including:

- Raising and lowering the side stand.
- Use of center stand (optional).
- Moving the motorcycle by hand.
- The "buddy push" (optional).

Starting the Engine--The procedures involved in starting the engine, including:

- Preparing the engine for starting.
- Mounting the motorcycle.
- Putting the motorcycle in neutral (to include gear pattern).
- Operating the kickstarter.

Starting and Stopping the Motorcycle--The procedures involved in putting the motorcycle in motion and bringing it to a stop, including:

- Putting the motorcycle in first gear.
- Clutch-throttle coordination.
- Accelerating in first gear.
- Disengaging the clutch.
- Applying the brake.

Orientation (Optional)--An orientation to the Course, including:

- Role of motorcycle in transportation.
- Potential hazards of motorcycle operation.
- The role of good instruction in accident reduction.
- An overview of course content.

EQUIPMENT

In addition to the equipment identified in the Course Specifications, a motorcycle should be provided for classroom use in the event that the specified visual aids are not obtainable. Because all parts of the motorcycle cannot be readily seen by an entire class, this use of a motorcycle as a visual aid should be considered a last resort.

Where use of a classroom motorcycle is necessary, the following precautions should be taken.

- The fuel supply should be drained completely to eliminate fire hazard.
- The engine should be disabled (e.g., removal of breaker points) to discourage attempts at starting it.
- Normal precautions should be taken to prevent theft (e.g., locking front fork).

METHOD

1. Introduction to Motorcycling 5 minutes

The introduction to the Course should focus upon the motorcycle itself and treat (1) the role of the motorcycle in transportation, (2) potential hazards in motorcycle operation, and (3) the importance of instruction as a means of overcoming hazards. A series of graphics may be used to communicate major points. However, a motion picture might be used effectively to enhance presentation of introductory content. Its ability to show the dynamics of motorcycle operation both enhances interest and helps communicate content.

1.1 Role of the Motorcycle

The role of the motorcycle in transportation makes a logical point of introduction to the Course. However, since students have already manifested an interest in motorcycles, this topic does not require a great deal of emphasis. Specific items of information to be treated include the following:

1. Increased popularity of the motorcycle.
2. Fuel economy.
3. Recreational use of the motorcycle.

1.2 Potential Hazards

The potential hazards of motorcycle operation should be objectively communicated, not to frighten students but to establish the importance of acquiring the necessary knowledges, skills, and attitudes, and thus lay a foundation for the Course itself. Many students will have enrolled in the Course simply to learn how to ride; some will already know how to ride and simply be seeking an opportunity to do so. Objective treatment of potential hazards will help prepare students for the heavy safety orientation that characterizes both classroom and laboratory instruction. The treatment of hazards should include a teacher-led discussion of the following:

1.2.1 Nature of Hazards--The characteristics of the motorcycle that create an inherent hazard potential.

(1) Difficulty in detecting the presence and speed.
(2) Lack of protection to the operator.
(3) The inherent instability that is characteristic of two-wheel vehicles.

1.2.2 Magnitude of Hazards--Empirical data establishing the degree of hazard involved, including the following information items:

(1) The number of fatalities per vehicle is double that of automobiles.
(2) The number of fatalities per mile traveled is four times that of automobiles.
(3) Approximately half the fatalities occur to operators who have less than a year's experience.

1.3 Need for Instruction

The inherent hazard of motorcycle operation can only be overcome if the operator is better than the ordinary driver.

(1) Skill--The operator must be able to handle the motorcycle.
(2) Knowledge--The operator must know where the dangers are.
(3) Habits--The operator must be habitually alert to the dangers created by the roadway and other drivers.

2. Course Overview 5 minutes

A brief overview of the Course should follow the introduction. If the Course is presented in a modularized fashion (i.e., students receive selected instructional units), the various patterns should be described.

2.1 Course Description

The instructor should describe the nature and purpose of each of the instructional units:

Unit I	Basic Riding Skills--The ability to control the direction, speed, and balance of the motorcycle.
Unit II	Street Riding Principles--Knowledge of principles for safe interaction with the roadway and traffic environment.
Unit III	Street Riding Skills--The ability to cope with the hazards of the roadway/traffic environment.
Unit IV	Motorcycle Maintenance--The ability to service and repair safety related components of the motorcycle.
Unit V	Off-Street Riding--The ability to cope with the hazards of the off-street environments.
Unit VI	Preparation for Travel--The ability to assure that the operator and motorcycle are adequately prepared for travel.

2.2 Unit Description

Following the description of the Course, the instructor will describe Unit I, Basic Riding Skills:

Lesson 1	Introduction to Motorcycle Operation--One classroom and two range sessions designed to introduce the student to motorcycle operation and to enable a student to maintain balance while operating the motorcycle under its own power.
Lesson 2	Basic Maneuvers--One classroom and one range session designed to enable the student to stop, shift, and turn the motorcycle and to perform simple maneuvers requiring all three.
	Proficiency Development--One range session in which students perform a variety of exercises intended to improve proficiency and basic vehicle control.

3. Preparing For Operation 15 minutes

Procedures involved in preparing the motorcycle for starting include the following:

3.1 Locating Parts.
3.2 Positioning the Motorcycle
3.3 Mounting and Dismounting

3.1 Locating Parts

Using transparencies, slides, or film strips, the instructor should review the location of those parts needed to start and operate the motorcycle.

(1) The discussion should include the following parts:

Controls	Ignition and Fuel System	Instrumentation
Front Brake	Ignition Switch	Speedometer
Rear Brake	Choke	Tachometer
Throttle	Fuel Supply Valves	Neutral light
Clutch	Starter	
Gear Change Lever	Engine Cut-Off Switch	

(2) If the needed visual aids are unavailable, an operational motorcycle may be used. However, because of the distance of some students from the motorcycle, and the fact that the motorcycle must be repositioned to permit all parts to be reviewed, use of a motorcycle should be considered a last resort.

(3) The review should be confined to location of the parts indicated. The instructor should not discuss, or allow students to discuss, any of the following:

(a) Location of other parts; other parts of the motorcycle will be introduced as needed.

(b) Function of parts; parts location should not be used as a vehicle for introducing functions. For example, discussion of brakes should not deal with operation or adjustment of brakes. Function will be discussed in the context of operating tasks.

3.2 Positioning the Motorcycle

Using transparencies, slides, filmstrips, or film clips, the instructor will review the procedures involved in moving the motorcycle into position for starting.

(1) Raising the Side Stand

The following procedures for raising the side stand will be demonstrated.

(a) Operator position -- Left side
(b) Hand position -- Left handlebar, seat
(c) Motorcycle position -- Raised to vertical.
(d) Lifting side stand with toe
(e) Lift to fully raised position

No reference need be made to the center stand. This will save time and avoid introducing any unnecessary complexity. Use of center stands will be described later.

(2) Moving a Motorcycle

The following procedure for moving a motorcycle will be demonstrated:

(a) Operator position -- Left side
(b) Hand position
(c) Motorcycle position
  - Left hand on left hand grip
  - Right hand behind seat [1]
(d) Squeeze clutch
(e) Pull the motorcycle straight ahead with the right hand
(f) Allow the motorcycle to slow to a stop
(g) Release the clutch, if necessary, to stop the motorcycle quickly.

(3) Lowering the Side Stand

The following procedures for lowering the side stand will be illustrated:

(a) Lowering with toe -- note flange.
(b) Check for fully lowered position--beyond 90°.
(c) Rest motorcycle on stand and check stability.

3.3 Mounting and Dismounting

Using dynamic visuals, or a series of static visuals, the instructor should demonstrate and explain the following procedures for mounting and dismounting.

(1) Mounting

The following elements of procedure should be reviewed:

(a) Motorcycle position -- On side stand
(b) Operator position -- Left side
(c) Handlebar position -- Rotated clockwise

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[1] An alternative procedure is to place the right hand on the right hand grip. While this allows the use of the front brake for stopping, it places the operator in an awkward body position making it difficult to turn the motorcycle sharply, hold it upright, or push it any distance, particularly if there is an uphill grade.

(d) Hand position -- On handlebars
(e) Swing leg clear of seat, rotating handlebars to straight ahead position
(f) While standing, raise side stand

(2) Dismounting

(a) Motorcycle position -- On side stand
(b) Operator position -- Standing
(c) Handlebar position -- Straight ahead
(d) Hand position -- On handlebars
(e) Swing right leg over seat allowing handlebars to rotate clockwise.

Placing the motorcycle on the side stand when mounting and dismounting simplifies the student's task by (1) allowing the motorcycle to support the student rather than vice versa and (2) permitting the handlebars to be rotated clockwise, placing the hand grips within easy reach. The conventional procedure will be demonstrated later during the range session, after students have mastered the simplified procedure.

4. Starting the Engine — 15 minutes

The teacher will review the procedures involved in starting the engine. The following topics will be discussed.

4.1 Fuel and Ignition Control Settings
4.2 Putting the Transmission in Neutral
4.3 Kick Starting

4.1 Fuel and Ignition Control Settings

Using a set of static visuals, the teacher will review the location, function, and operation of the following fuel controls:

(1) Fuel Control

(a) Identification and Location -- Illustrate the appearance of the fuel control valve and common locations.
(b) Purpose -- Closes fuel supply during non-use to prevent leakage.
(c) Settings
- Off
- On
- Reserve
- Prime (some motorcycles)

(2) Ignition

(a) Location -- Illustrate the common locations.
(b) Operation
- On
- Off
- Accessories

(3) Gearshift

(a) Motorcycle, like car, should be in neutral to start engine.
(b) Location -- Illustrates standard left foot position.
(c) Indicator Light -- Most motorcycles have light on dash indicating when transmission is in neutral. If not, roll motorcycle back and forth.
(d) Shifting into neutral is somewhat complicated and will be described in a moment.

(4) Engine Cut-Off Switch

(a) Often called "kill" switch.
(b) Location -- Right hand grip.
(c) Purpose -- To stop the engine in an emergency.
(d) Normally turn off engine with ignition switch.
- Prevents leaving ignition in "On" position and draining battery.
- Prevents attempting to start the engine without noticing the cut-off switch in the "Off" position.

(5) Choke

(a) Location -- Illustrate common locations.
(b) Purpose -- To make fuel mixture richer when the engine is cold.
(c) Opening choke
- Use only when engine is cold
- Describe common operations

(d) Closing the choke -- Close after engine is warm.
- Warm days -- several seconds
- Cold days -- a few minutes
- Close before putting the motorcycle in motion

4.2 Putting the Transmission in Neutral

Using dynamic visuals, or a set of static visuals, the teacher will review the procedures for placing the transmission in neutral in order to start the engine. Operation of the shift lever should be introduced before discussing the gear pattern, since the pattern is difficult to comprehend until operation of the lever is understood.

(1) Operation of Gear Shift Lever

(a) Lever only moves the transmission from one gear to the next; lever positions do not correspond to particular gears as in a car.
(b) Depressing the shift lever puts the transmission in the next lowest gear; raising the lever puts the transmission in the next highest gear.
(c) To change several gears, the shift lever must be depressed or raised several times.
(d) The clutch lever must be squeezed to change gears; need not be released after each gear change.

(2) Gear Pattern

Illustrate and describe the two common patterns.

(a) First Gear "on the bottom."
    - Down shift as far as possible (won't click any more).
    - Raise lever part way until neutral indicator light goes on
    - Release clutch and make sure motorcycle can move freely
(b) Neutral "on the bottom."
    - Continue downshifting until light goes on
    - Release clutch and make sure motorcycle can move freely

4.3 Kick Starting

Using dynamic visuals, the instructor will demonstrate and describe the procedures involved in kick starting the engine.

(1) Preparing to Kick Start

(a) Fold out kick start lever
(b) Support body on left foot
(c) Keep side stand down
(d) Place instep of foot on kickstart lever
(e) Press down kickstart lever until resistance is felt
(f) Open the throttle slightly

(2) Kicking

   (a) Thrust downward quickly; the quicker the lever moves, the more likely the engine is to start.
   (b) Avoid jumping on kick start lever.
   (c) Hold down lever until engine is running or comes to a stop.
   (d) Allow the lever to gently return to the original position; don't let it snap back.
   (e) Repeat procedure as necessary until the engine starts.

(3) If engine cannot be started, repeat the prestart procedures by checking the following:
   - Fuel valve
   - Ignition
   - Engine cut-off switch
   - Choke

The instructor should avoid discussing starting problems other than those involving failure to perform the prestarting procedures described (e.g., exclude discussion of flooding, dead plugs).

5. Putting the Motorcycle in Motion 10 minutes

Using dynamic visual aids, or a set of static visual aids, the instructor will review the procedures involved in putting the motorcycle in motion. A sound motion picture is most desirable in this application since it will assist students in recognizing the sounds associated with the friction point.

5.1 Procedure for Putting the Motorcycle in Motion

The teacher should illustrate and describe the process of getting the motorcycle underway in terms of the following procedure:

(1) Shift into First

   (a) Squeeze clutch.
   (b) Shift into first gear -- review gear pattern.

(2) Release to Friction Point

   (a) Open the throttle enough to race the engine slightly.
   (b) Gradually release the clutch until the "friction point" is reached, that is the engine begins to slow down slightly.

(3) Start Motorcycle Moving

(a) Continue to release the clutch very gradually as the motorcycle begins to move.
(b) After the motorcycle is in motion, release the clutch completely and open the throttle to increase speed.

Note: For the sake of simplicity, student should not be told to open the throttle while releasing the clutch. Simultaneous manipulation of both controls is unnecessarily complicated.

5.2 Bringing the Motorcycle to a Stop

The instructor should illustrate and describe the following procedures for bringing the motorcycle to a stop:

(1) Disengaging the Engine

(a) Gradually close the throttle.
(b) Squeeze the clutch.

(2) Stop the Motorcycle

(a) Gradually apply the brakes.
(b) Put feet down as the motorcycle comes to a stop.

Note: It is unnecessary at this point to discuss which foot should be used since the student will have little control over the direction of lean.

5.3 Safety Precautions

The following safety precautions should be illustrated and described:

(1) "Knuckles Up"

The hands should grasp the throttle with the knuckles up in order to help prevent inadvertent over-application of the throttle.

(2) Covering the Clutch

The student should be instructed to keep four fingers "covering" the clutch at all times so as to be ready to squeeze it if the motorcycle "starts to get away from him" or if trouble develops.

(3) Foot Position

While the feet should generally be kept on the pegs during operation, it is alright for students to hold them in an "outriggers" position until they have learned to maintain balance.

6. Course Requirements — 5 minutes

The instructor should describe briefly the following Course requirements:

6.1 Instructional Methods
6.2 Schedule
6.3 Student Responsibilities

6.1 Instructional Methods

The general class/lab instructional sequence should be reviewed with specific attention to the following:

(1) In general, each lesson consists of a classroom followed by one or more laboratory (on motorcycle) sessions.

(2) Laboratory sessions involve both off-street operation and street riding.

(3) Each classroom provides preparation for laboratory sessions. Students missing a classroom session may be prevented from advancing in laboratory sessions.

6.2 Schedule

The schedule of class and laboratory sessions should be reviewed and attention given to the following:

(1) Attendance requirements.

(2) Session dates.

(3) Duration of class and laboratory sessions.

(4) Notification of schedule changes.

(5) Rainy day procedures--Next class/lab sessions will be switched.

6.3 Student Responsibilities

Students should be informed as to their responsibilities relative to laboratory sessions:

(1) Gear Requirements--What items of gear must be furnished by the student, including the following:

(a) Shoes or boots
(b) Full trousers
(c) Jacket
(d) Gloves
(e) Helmet (if not provided)
(f) Eyes/Face Protection (if not provided)

(2) Legal Requirements--What permits or licenses must be obtained before the first on-street session.

7. Range Preparation 5 minutes

The instructor should provide a brief overview of the two range sessions that follow the class session. If time permits, safety precautions and communication procedures should also be reviewed.

7.1 Session Overview

The instructor should briefly describe the activities to take place in Sessions 2 and 3.

Session 2

(1) Positioning the motorcycle

(2) Mounting and dismounting

(3) Starting the engine

(4) Putting the motorcycle in motion

Session 3

Practice in starting and stopping the motorcycle and in maintaining balance.

7.2 Safety Precautions

If time permits, the precautions listed below should be reviewed. If sufficient time is not available, the students' attention should be directed to the relevant portion of student materials.

(1) Wear protective gear at all times.

(2) Ride only where and when instructed.

(3) Ride at designated speeds.

(4) Keep specified distance between motorcycles,

(5) Respond to instructions without delay.

(6) Leave exercise area in the event of:

  (a) Motorcycle malfunctions
  (b) Confusion regarding instructions
  (c) Hazardous conditions

7.3 Range Communications

If time permits the following hand signals should be reviewed (even though radio communications are provided). If insufficient time is available, the students' attention should be directed to the relevant portion of student materials.

Hand Signals

(1) Start moving

(2) Stop moving

(3) Start engine

(4) Stop engine

(5) Slow down

(6) Speed up

(7) Ride closer together or close up

(8) Ride farther apart or open up

(9) Ride this direction

(10) Ride over to me or assemble here

(11) Leave the exercise area

MOTORCYCLE SAFETY EDUCATION PROGRAM

UNIT	LESSON	SESSION	TITLE	MODE
I	1	2	Putting the Motorcycle in Motion	Range

PURPOSE

The purpose of this Session is to enable the student to put the motorcycle in motion under its own power.

CONTENT

This Session consists of the following activities:

1. Orientation to Range Instruction
2. Walking the Motorcycle
3. Mounting and Dismounting
4. Locating Neutral
5. Developing Balance
6. Starting the Engine
7. Putting the Motorcycle in Motion

In order to enable students to operate the motorcycle under its own power during the first Range session, non-operational instruction is reduced to a minimum. The pre-operative inspection, often taught as a part of the first Range activity, is deferred until Unit IV Maintenance, where it is integrated with other inspection and servicing instruction.

The instructional sequence delays "Starting the Engine" until the point at which it is needed, that is, the point at which powered operation is introduced.

METHODS

1. Orientation to Range Instruction 5 minutes

A brief orientation session will be necessary to review communication signals and reinforce safety procedures and identify lesson activities. This orientation should include any range or cycle specific administrative information (such as returning the motorcycle to the storage area, turning in keys, etc.). It is best to present any orientation information before the students become involved with putting on and inspecting protective gear or before they spread out to their riding stations.

- 1.1 Communications
- 1.2 Safety Procedures
- 1.3 Lesson Activities

1.1 Communications

Procedures for use of range communication equipment or communication signals will be demonstrated. Since communication signals have been previously covered in class and through student material, the instructor can give the signals and the students can supply the meaning for each signal. Communication signals for the range are as follows:

(1) Start moving
(2) Stop moving
(3) Start engine
(4) Stop
(5) Slow down
(6) Speed up
(7) Ride closer together or close up
(8) Ride farther apart or open up
(9) Ride this direction
(10) Ride over to me or assemble here
(11) Leave the exercise area

1.2 Safety Procedures

Safety information on the following should be reviewed:

(1) Requirement and use of protective gear

(a) Helmet
- Guide in selection
- Select an appropriate size
- Try on (able to get it on, snug fit)
- Check size (no more than 1 inch head movement)
- Fastener

(b) Eye/face protection
(c) Jacket and trousers
(d) Appropriate footwear
(e) Gloves

(2) Where and when to ride

(3) Exercise and area speeds

(4) Operating distance between motorcycles

(5) Responding immediately to instructions

(6) Stopping or leaving an exercise

(a) Motorcycle malfunctions
(b) Unclear about instructions
(c) Dangerous conditions

1.3 Session Activities

Provide an overview of Session activites including:

(1) Walking the motorcycle (with engine off)

(2) Mounting and dismounting

(3) Developing balance (with engine off)

(4) Starting the engine

(5) Locating the friction point (engine running, let clutch out until motorcycle moves)

(6) Securing the motorcycle

2. Walking the Motorcycle

2.1 Moving Motorcycle Forward

7 minutes

(1) Purpose--The purpose of the exercise is to aid the students in "feeling" the weight of the motorcycle, off-loading weight by leaning the motorcycle in to them and feeling the effects of steering.

(2) Range Layout--A pair of markers will be needed for each motorcycle used up to a maximum of 12 vehicles. The markers should be set sufficiently far apart to allow the motorcycle to get under way in later Buddy Push and Basic Power exercises, yet sufficiently close to allow students to maintain a straight line path between the two markers. A separation of approximately 100 feet will fulfill this requirement. Each pair of markers should be separated by at least 15 feet to keep students from getting in the way of one another. Adjacent pairs of markers should be differentiated from one another through color, size, or shape in order that students will be able to distinguish them.

Refer to the illustrative layout "walking the motorcycle."

(3) Exercise Procedure--A student is positioned at one of the markers in the pair. Upon being signalled by the instructor, each walks the motorcycle toward the other marker, turns around the marker and returns to the original position.

(4) Operating Procedures--A student will perform the exercise using the following procedures:

- (a) Operator positioned on left side of motorcycle.
- (b) Hand position
  - Left hand on left handlebar
  - Right hand behind seat [1]
- (c) Place transmission in first.
- (d) Raise stand.
- (e) Motorcycle position--leans slightly toward operator.
- (f) Squeeze clutch
- (g) Move the motorcycle forward slowly.
- (h) Allow motorcycle to slow down.
- (i) Stop by releasing clutch.
- (j) Lower stand.

(5) Instruction Points

- (a) Posture
- (b) Stability
- (c) Maintaining course

(6) Method--The exercise should begin with an instructor-guided student demonstration of the correct operating procedures. The students completing the successful demonstration may proceed to individual student practice while the next student provides a demonstration.

2.2 Moving the Motorcycle Backwards 3 minutes

(1) Purpose--Same as in 2.1 (1).

(2) Range Layout--Same as in 2.1 (2).

(3) Exercise Procedure--The students are to walk the motorcycle forward about 15 feet from the starting area, then stop and back the motorcycle to the starting target, back around the target and stop.

(4) Operating Procedures--None needed.

(5) Instruction Points--Same as in 2.1 (5).

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[1] An alternative procedure is to place the right hand on the right hand grip. While this allows the use of the front brake for stopping, it places the operator in an awkward body position making it difficult to turn the motorcycle sharply, hold it upright, or push it any distance.

(6) Method--None needed.

3. Mounting and Dismounting 5 minutes

3.1 Mounting

(1) Purpose--The purpose of this exercise is to provide students an opportunity to practice mounting procedures and to develop skill in:

(a) Maintaining the motorcycle in an upright position while mounting.
(b) Judging how high the leg must be lifted to clear the seat of the motorcycle.

(2) Range Layout--No particular layout is required by this exercise. However, the same layout described in 2.1 may be used.

(3) Exercise Procedure--Students should position their motorcycles at least 10 feet from one another. If the range is laid out as described in 2.1, motorcycles may be positioned next to starting cones. Upon being told to do so, students mount their motorcycles and sit on them.

(4) Operating Procedures--A student will perform the exercise using the following procedures:

(a) Motorcycle position--On side stand.
(b) Operator position--On left side of motorcycle.
(c) Handlebar position--Rotated clockwise.
(d) Hand position--On handlebars.
(e) Swing leg over the seat, rotating handlebars to straight ahead position.
(f) While standing, raise side stand all the way up.

(5) Instruction Points

(a) Hand position.
(b) Motorcycle on stand.

(6) Method--The exercise should begin with an instructor demonstration of the correct operating procedure.

3.2 Dismounting

(1) Purpose--Essentially the same as 3.1.

(2) Range Layout--Essentially the same as 3.1.

(3) Exercise Procedure--Students are to dismount from the motorcycles.

(4) Operating Procedures--Students will perform the exercise using the following procedures:

- (a) Motorcycle positon--On side stand.
- (b) Operator position--Standing.
- (c) Handlebar position--Straight ahead.
- (d) Hand position--On handlebars.
- (e) Swing right leg over seat allowing handlebars to rotate clockwise.

(5) Instruction Points

- (a) Motorcycle on stand.

(6) Method--The exercise should begin with an instructor demonstration of the correct operating procedures.

4. Locating Neutral 5 minutes

(1) Purpose--The purpose of this exercise is to help the students find neutral.

(2) Range Layout--Students should be positioned in a circle around the instructor with enough space between cycles to allow students freedom of movement. This configuration allows students to hear and permits the instructor to monitor students' performance quickly.

(3) Exercise Procedure--Students are to mount the motorcycles and practice finding neutral.

(4) Operating Procedures--Students will perform the exercise using the following procedures:

- (a) Mount motorcycle, supporting it on the right foot.
- (b) Put left foot on peg in position to shift.
- (c) Squeeze clutch.
- (d) Depress or raise lever one "notch."
- (e) Release clutch.
- (f) Roll the motorcycle forward to verify that it is in neutral.

(5) Instruction Points

(a) Don't allow students to rely on neutral light.

(6) Method--The exercise should begin with an instructor-guided student demonstration of the correct operating procedures. The students completing the successful demonstration may proceed to individual student practice while the next student provides a demonstration.

5. Developing Balance

5.1 Straddle Walk 5 minutes

(1) Purpose--The purpose of this exercise is to help the students develop balance and control of the motorcycle under non-threatening conditions.

(2) Range Layout--Same as in 2.1.

(3) Exercise Procedure--Students are to mount the motorcycles and straddle walk them to and around the target cones, and then straddle walk the motorcycles back to the starting area targets.

(4) Operating Procedures--Instructor demonstration using the following procedures:

(a) Mount motorcycle and sit on it.
(b) Shift to neutral gear.
(c) Paddle with feet to gain momentum.
(d) Steer toward target marker.
(e) Stop on right side of marker by applying front brake.
(f) Straddle walk around marker.
(g) Straddle walk to starting target.
(h) Stop on right side of marker by applying front brake.
(i) Straddle walk around marker.
(j) Dismount.

(5) Instruction Points--Observe for and assist students with:

(a) Moving the motorcycle
(b) Maintaining stability

(6) Method--The exercise should begin with an instructor demonstration of the correct operating procedures.

5.2 Buddy Push 5 minutes

(1) Purpose--The purpose of this exercise is to allow students to acquire skills in straight-line balance of the motorcycle. The motorcycle is pushed by another student rather than operated under its own power (thus it is unnecessary for the student to manipulate or coordinate the clutch and throttle).

(2) Range Layout--Same as 2.1.

(3) Exercise Procedure

(a) The students will pair up and use every other motorcycle for this exercise. Motorcycles should be positioned at the starting marker.

(b) One student in each pair will mount the motorcycle; the other will push the motorcycle from behind.

(c) The "pusher" will increase speed until the motorcycle is moving fast enough so that the rider can lift his feet and place them on the pegs without falling.

(d) The rider will steer toward the marker.

(e) Upon reaching the marker, the rider will stop the motorcycle by applying the rear brake.

(f) The rider will then straddle walk the motorcycle around the marker and be pushed back toward the starting marker (except where there is an incline, in which event, the motorcycle will be returned to the starting point).

(g) When one practice circuit has been completed, students will change positions.

(h) The process will be repeated for the duration of the exercise group.

(4) Operating Procedures--The exercise will be performed using the following procedures:

(a) Pusher

- Stands behind motorcycle
- Pushes with hands on rear of seat
- Stops pushing when cycle is in motion
- Avoids "pushing off."
- Pushes again if rider stops

(b) Rider

- Sits on cycle and shifts to neutral.
- Places feet on pegs when in motion, assume proper posture.
- Steers toward target marker.
- When slowing begins, stops with rear brake. The rear brake is used in order to keep riders' feet on pegs as long as possible, thus tending to develop low speed balance.
- Repeats first 4 steps.
- At target marker, stops with rear brake.
- Straddle walks around marker.
- Repeats procedures to return to starting area.

(c) If there is an incline at one side of the range or if range has a transverse grade, the students should start at the high end to take advantage of the grade. They may then return to the original starting point rather than having to push uphill.

(5) Instruction Points--The instructor will observe for and assist students with:

(a) Posture
(b) Stability
(c) Maintaining course
(d) Keeping eyes on the target marker

(6) Method--The instructor will demonstrate the buddy push, first serving as the rider while a student pushes, then as the pusher while a student rides. In a class of 12, the two instructors may serve as rider and pusher.

6. Starting the Engine

6.1 Pre-Start Procedures 5 minutes

(1) Purpose--The purpose of this exercise is to have the students prepare the motorcycle for operation.

(2) Range Layout--Same as 4.1

(3) Exercise Procedure--Students are to perform pre-operative procedures.

(4) Operating Procedures--The exercise will be performed using the following procedures:

(a) Switch fuel valve setting to ON
(b) Turn ignition switch to ON
(c) Make sure transmission is in neutral
(d) Turn engine cut-off (kill) switch to RUN or ON
(e) Open choke

(5) Instruction Points--The instructor will check each motorcycle to make sure controls are in the correct position.

(6) Method--Students simply perform the exercise once prior to Exercise 6.2.

6.2 Kickstarting 5 minutes

(1) Purpose--The purpose of this exercise is to allow students to develop skill in kickstarting the motorcycle.

(2) Range Layout--Same as 4.1.

(3) Exercise Procedure--The students are to mount the motorcycle and start the engine.

(4) Operating Procedures--Students will start the engine using the following procedures:

(a) Fold out kickstart lever
(b) Support body on left foot
(c) Lean motorcycle toward support leg
(d) Keep side stand down
(e) Press down kickstart lever until resistance is felt
(f) Open throttle slightly
(g) Thurst downward quickly to bottom of kickstart stroke
(h) Avoid jumping on kickstart lever
(i) Hold lever down until engine is running or comes to a stop
(j) Allow lever to gently return to original position (they must not let it snap back)
(k) Repeat procedure as necessary until the engine starts
(l) If engine will not start, repeat pre-starting checks

(5) Instruction Points--The instructor will observe for, and assist students relative to, the following errors:

- (a) Improper foot position on kickstart lever
- (b) Insufficient force to start engine
- (c) Failure to hold kickstart lever down while starter is turning
- (d) Allowing the kickstart lever to snap up
- (e) Fuel or kill switch in the wrong position

(6) Method--The instructor will demonstrate only once, following which students may practice individually

7. Putting the Motorcycle in Motion

7.1 Locating the Friction Point — 15 minutes

(1) Purpose--The purpose of this exercise is to enable the students to manipulate the clutch and throttle in order to find the friction point, and pass through the friction point without stalling the engine.

(2) Range Layout--Same as 2.1.

(3) Exercise Procedure--Students are to start the motorcycle, put it in gear and release the clutch till the motorcycle starts to move. When the motorcycle has travelled about 3 or 4 feet, they are to pull the clutch back in. Students are to practice this exercise going across the range to the appropriate target marker, paddle walking around the marker and then returning.

(4) Operating Procedures--The exercise will be performed using the following procedures:

- (a) Perform pre-start procedures
- (b) Mount cycle
- (c) Start engine
- (d) Squeeze clutch
- (e) Shift into first gear
- (f) Open throttle enough to race engine slightly
- (g) Gradually release clutch to "friction point"
- (h) As cycle begins to move, release throttle and pull in clutch
- (i) Apply the brake to bring the motorcycle to a stop. Students should not attempt to open the throttle and release the clutch simultaneously. The coordination involved is too difficult to achieve this early in instruction.

(5) Instruction Points--The instructor should observe and assist students relative to the following:

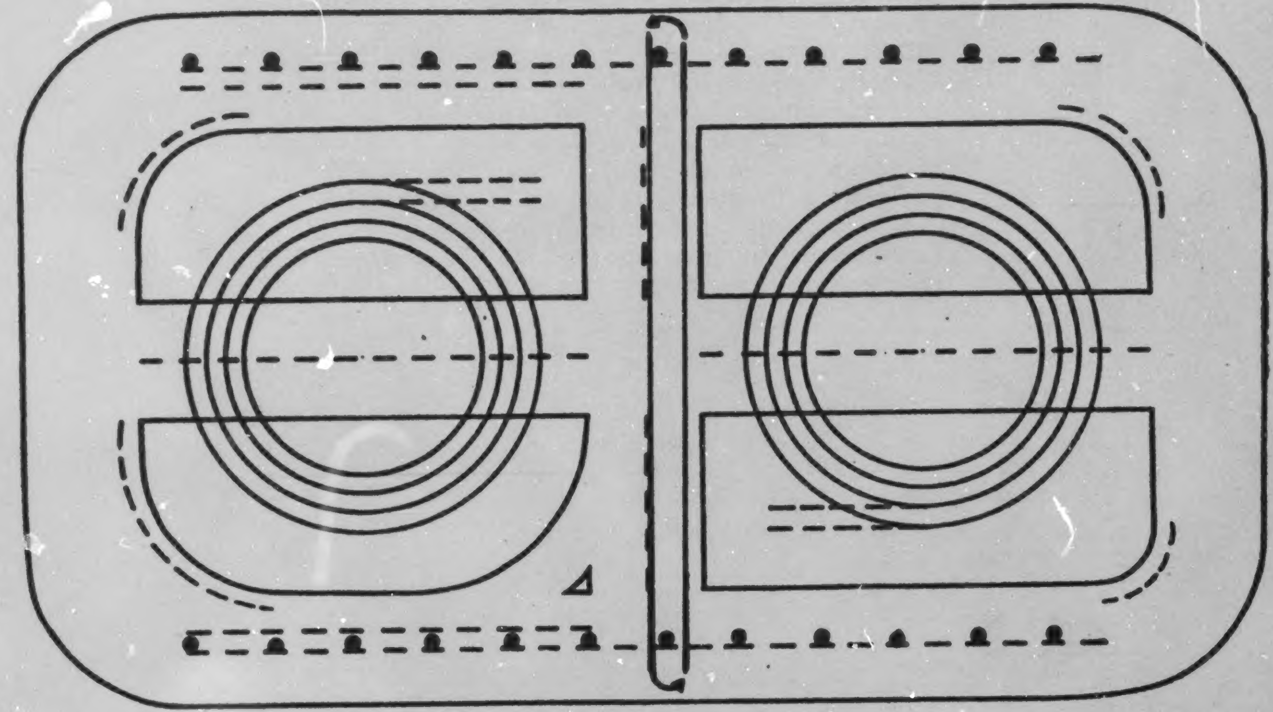
- (a) Using insufficient throttle (stalling)
- (b) Using excessive throttle (racing the engine)
- (c) Releasing the clutch too quickly (stall or jerky start)

(6) Method--The instructor will demonstrate the procedure and then guide students individually. After one demonstration students will practice while the instructor gives additional guidance to students who are having trouble. A student having extreme difficulty mastering this coordination may use a motorcycle with a sturdy center stand, if one is available. With the motorcycle on the stand and the rear wheel raised, the student can practice the clutch-throttle coordination without stalling the engine. The front wheel should be placed against a wall to prevent the motorcycle from rolling off the center stand with the rear wheel turning.

EXERCISE 2 - WALKING THE MOTORCYCLE

EXERCISE 5.1 - STRADDLE WALK

EXERCISE 5.2 - BUDDY PUSH



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MOTORCYCLE SAFETY EDUCATION PROGRAM

UNIT	LESSON	SESSION	TITLE	MODE
I	1	3	Maintaining Balance and Direction	Range

PURPOSE

The purpose of this Session is to enable the student to control the motorcycle while operating on a straight and curved path.

CONTENT

This Session consists of the following exercises:

1. Accelerating the Motorcycle
2. Maintaining a Straight Course
3. Changing Direction
4. Shutdown Procedures

METHODS

1. Accelerating the Motorcycle 20 minutes

(1) Purpose--The purpose of this exercise is to allow students to develop proficiency in maintaining straight-line balance and in coordinating clutch, throttle, and brake.

(2) Range Layout--Same as layout for Session 2. Refer to illustrative diagram "Accelerating the Motorcycle."

(3) Exercise Procedure--The students are to start at one marker and ride the motorcycle about 20 feet toward the target marker and bring it to a stop with both brakes. Then they are to start again and move about another 10 feet. This process is to be repeated until the target marker is reached. Then students are to paddle walk the motorcycle around the target marker and return to the original marker travelling 20 feet at a time, and again paddle walking around the marker.

The same procedure is to be repeated through the duration of the exercise time.

(4) Operating Procedures--The exercise will be performed using the following procedures:

(a) Perform prestart procedures
(b) Mount motorcycle
(c) Start engine
(d) Start motorcycle

- Squeeze clutch
- Shift into first gear
- Open throttle enough to race engine slightly
- Release clutch gradually until friction point is reached
- Continue to release the clutch gradually as the motorcycle begins to move
- Raise the feet to foot pegs
- Release the clutch completely
- Open the throttle slightly

(e) Stop motorcycle

- Gradually close the throttle
- Squeeze the clutch
- Gradually apply pressure to both brakes
- Put the foot down as the motorcycle comes to a stop

(5) Instruction Points--Instructor will watch for the following:

(a) Posture
(b) Feet up on pegs when moving
(c) Foot to surface just before stop
(d) Using both brakes
(e) Looking ahead at target rather than at controls
(f) Under- or over-revving the engine
(g) Knuckles up on throttle
(h) Covering the clutch
(i) Maintaining separation

While the instructor should also watch for indication of difficulty in clutch-throttle coordination, balance and directional control, guidance will necessarily be confined to the procedural aspects of the performance.

(6) Method--The exercise will commence with an instructor demonstration followed by individual student practice.

2. Maintaining a Straight Course 20 minutes

(1) Purpose--The purpose of this exercise is to develop the steering skills required in maintaining balance and keeping the motorcycle moving in a straight line. This exercise is also intended to help in routinizing the manipulation of clutch and throttle and allow attention to be devoted to directional control.

(2) Range Layout--Exercise 1. Refer to illustrative diagram "Maintaining Balance and Direction."

(3) Exercise Procedure--Students are to ride to the target marker at about 10 mph. They will stop at the marker, shift to neutral, straddle walk around the marker, and then ride back to the starting marker.

(4) Operating Procedures--The exercise will be performed using the following procedures:

(a) Look ahead to target marker
(b) Maintain proper posture:

- Lean forward slightly with back straight
- Hands grasping firmly with wrists down
- Arms slightly bent
- Knees against tank
- Feet firmly on pegs

(5) Instruction Points--Same as Exercise 1.

(6) Method--Students may commence practice without a demonstration. The instructor would provide assistance to those having difficulty.

3. Changing Direction 15 minutes

(1) Purpose--The purpose of this exercise is to enable students to maintain balance while making simple direction changes. It also allows students to obtain practice of all previous skills without having to stop and straddle walk the motorcycle.

(2) Range Layout--Students are to ride around the outer perimeter of the range area, making wide 90 degree turns at all four corners. Refer to the illustrative layout "Changing Direction."

(3) Exercise Procedures--The students will ride around the range at about 10-15 mph in first gear. All students will ride in the same direction keeping about 40 feet between riders. The instructor should reverse the direction every 10 minutes.

(4) Operating Procedures--Same as described in Exercise 2. No attempt should be made to provide instruction in turning technique at this point.

(5) Instruction Points--Same as Exercise 1.

(6) Method--Students may proceed directly from practice on Exercise 2 without further instruction.

4. Shutdown Procedures 5 minutes

(1) Purpose--The purpose of this exercise is to allow students to apply shutdown procedures.

(2) Range Layout--The students will walk the motorcycles to the storage vicinity but not attempt to put them away.

(3) Exercise Procedure--The students are to shut down and secure the motorcycles after use.

(4) Operating Procedures--The exercise will be performed using the following procedures:

(a) Shifts to first gear
(b) Shuts off engine
(c) Places on stand--checks surface for capability to support motorcycle--if necessary, places support beneath stand
(d) Removes ignition key
(e) Turns off fuel supply

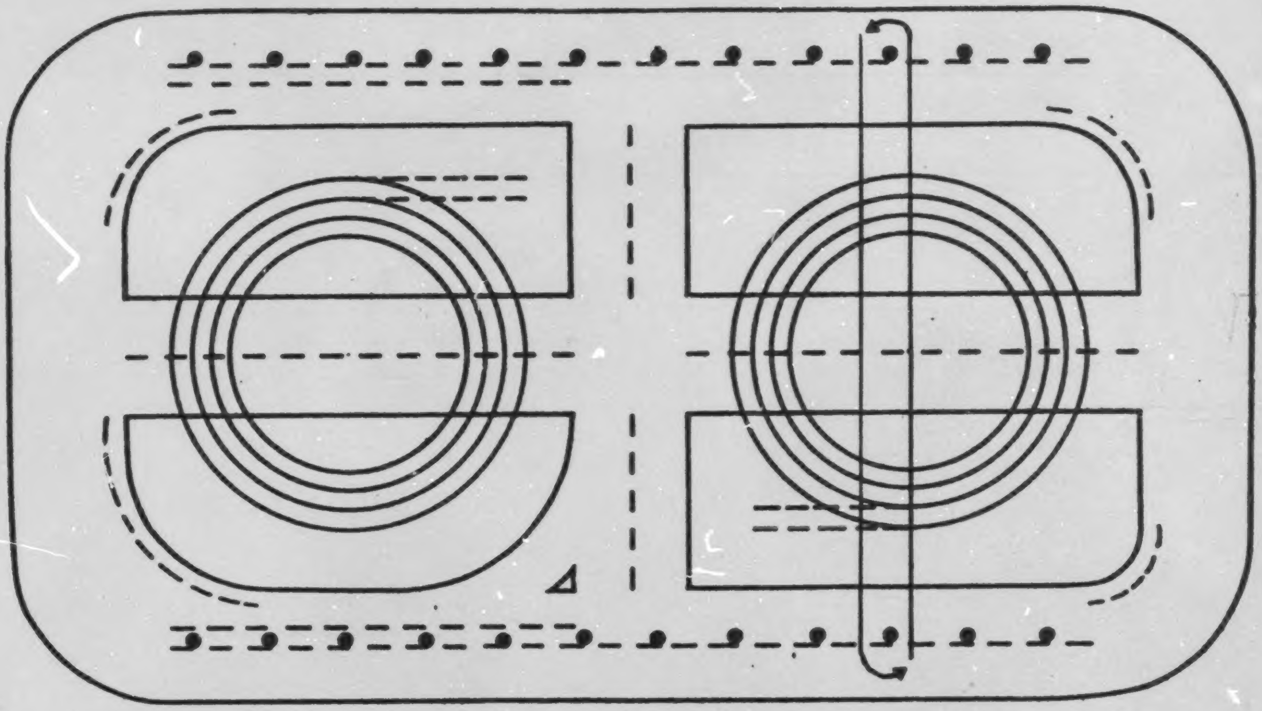
(5) Instruction Points:

(a) Ignition off
(b) Kill switch off
(c) Fuel supply off
(d) Key removed

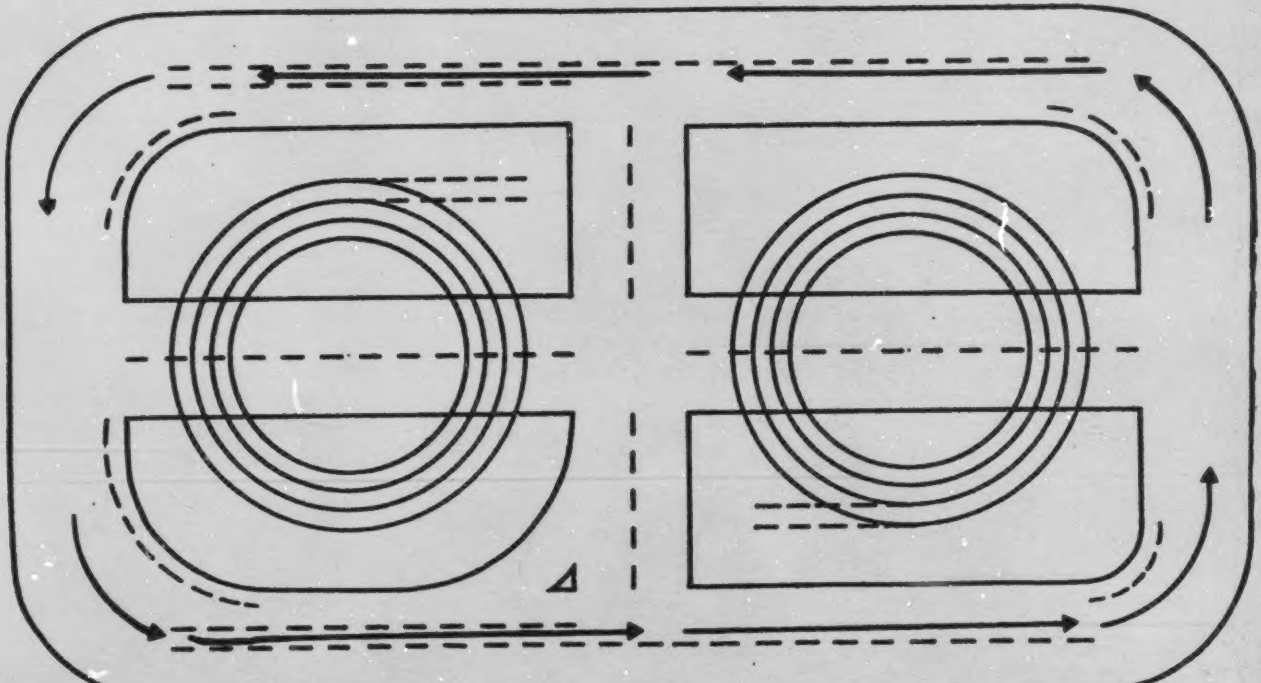
(6) Method--The students will perform the above exercise once without an instructor demonstration. The instructor will correct any deficiencies.

EXERCISE 1 - ACCELERATING THE MOTORCYCLE

EXERCISE 2 - MAINTAINING BALANCE AND DIRECTION



EXERCISE 3 - CHANGING DIRECTION



MOTORCYCLE SAFETY EDUCATION PROGRAM

UNIT	LESSON	TITLE
I	2	Basic Maneuvers

PURPOSE

The purpose of this lesson is to prepare the students to perform basic motorcycle maneuvers by providing the knowledges and skills underlining lateral and longitudinal control of the motorcycle.

OBJECTIVES

Performance Objectives	Knowledge and Skill Objectives
POSTURE	The student must know the effects of proper arm, leg, and body position on maintaining balance.
STOPPING	
Brake Use--The student must use both brakes in making a normal stop.	The student must know the advantage of using both brakes for normal stopping.
Controlled Stopping--The student must be able to come to a gradual stop at a predetermined point.	The student must be able to perceive the distance it will take the motorcycle to stop smoothly at any given point.
	The student must be able to judge how much brake pressure must be applied to stop the motorcycle within a prescribed distance at any speed.
Maintained Stop--The student must maintain brake pressure with the front brake lever and hold the front wheel straight ahead while stopping.	The student must know the effect of maintained brake pressure on preventing accidental forward motion (e.g., inadvertent clutch release) and the improvement in the motorcycle's detectability (i.e., brake light).

Performance Objectives	Knowledge and Skill Objectives
SHIFTING	
Shifting--The student must be able to shift from neutral up through the gears and down again.	The student must know the effects of proper clutch and throttle application upon transmission wear. The student must be able to coordinate throttle, clutch and shift lever to shift without racing the engine between gears causing the motorcycle to lurch or deviate from the intended line of travel, or removing eyes from the path ahead.
Gear Selection--At any speed, the student must operate in that gear which provides a suitable acceleration capability.	The student must know the proper engine RPM, gear selection, and speed for adequate acceleration. The student must be able to identify proper engine speed through auditory cues.
Shifting Problems--The student must be able to free a stuck shift lever.	The student must be able to identify the symptoms of a stuck shifter.
TURNING	
Turning--The student must be able, while in first gear, to turn along a prescribed path.	The student must know the effects of body and motorcycle lean, steering, and speed, upon turning. The student must be able to coordinate steering and throttle adjustment to maintain balance while turning.
OPERATING ON GRADES	
The student must be able to mount and start the engine on graded surfaces (up, down, and off-camber) without dropping the motorcycle or allowing it to roll. The student must also be able to accelerate from a stopped position on an upgrade without losing balance or killing the engine.	The student must be able to coordinate throttle, clutch, and brake in order to place the motorcycle in motion on an upgrade.

CONTENT

The above objectives are met through:

(1) Basic Maneuver Procedures (Classroom)

(2) Basic Maneuver Skills (Range)

MOTORCYCLE SAFETY EDUCATION PROGRAM

UNIT	LESSON	SESSION	TITLE	MODE
I	2	1	Basic Maneuver Procedures	Classroom

PURPOSE

The purpose of this Session is to prepare students to perform basic motorcycle maneuvers by providing the knowledges underlying lateral and longitudinal control of the motorcycle.

CONTENT

The content of this Session includes the following topics:

1. Posture
2. Stopping
3. Shifting
4. Turning
5. Starting on an Incline
6. Range Preparation

MATERIALS

Instructional Aids

Instructional aids for this Session include the following:

Static Visuals

Posture--A set of visuals indicating correct riding posture.

Turning Forces--A set of graphic aids illustrating the interaction of outward and gravitational forces on the following:

- Maintaining a stable leaning angle in a turn.
- Maintaining stable lean angles in turns at different speeds and rate of turn.
- Entering, negotiating, and coming out of a normal turn.
- Excessive speed resulting in (a) lack of control and (b) effective correction.

Dynamic Visuals

Braking Procedures--Including the following:

- Simultaneous application of front and rear brake.
- The effect of front vs. rear brakes on stopping distance.

Turning Procedures--Including the following:

- Adjusting speed on approach.
- Leaning the motorcycle.
- Leaning the body with the motorcycle.
- Coming out of the turn.

Dynamic Audio Visuals

Shifting Procedures--Including the following:

- Sounds associated with proper shifting, over-revving, and lugging.
- The effect of incorrect upshifting and downshifting upon motorcycle operation.

Starting on an Incline--Including the following:

- Coordination of clutch, throttle and brake.
- Sounds associated with proper engine revving.

METHODS

1. Posture 5 minutes

Using static visuals, the instructor should review the following elements of posture:

(1) Body

(a) Leaned slightly forward--overcomes wind resistance.

(b) Back straight--prevents fatigue.

(2) Arms--slightly bent to allow handlebars to be rotated.

(3) Hands--holding hand grips firmly but comfortably.

(4) Knees--pressed lightly against gas tank; helps maintain secure position.

(5) Feet

(a) Both feet on the foot pegs to maintain stable position on motorcycle.

(b) Instep of each foot on foot peg, feet parallel to the ground.

(6) Seat position

(a) Longitudinal position adjusted to permit the above.

(b) Lateral position--squarely in the middle of the seat.

Discuss posture in relation to maintaining control and reducing fatigue, not in terms of "form."

2. Stopping 10 minutes

In previous range instruction, students have been provided instruction and practice in using the brakes. However, the object of such instruction and practice has been simply to enable the student to bring the motorcycle to a stop. No instruction in correct braking technique has been provided. Topics to be discussed under "Stopping," include:

2.1 Use of Front Brake
2.1 Proper Braking Technique

2.1 Use of Front Brake

Owing to (1) cautions given during range instruction, and (2) misinformation received from others, students may be reluctant to use the front brake. The following instruction is intended to overcome reluctance to use the front brake.

(1) Advantages of front wheel braking

(a) Front wheel brake supplies 70% of braking force.

(b) Stopping distance is substantially reduced by front wheel braking.

(c) Many accidents are attributed to failure to use the front brake, i.e., the motorcycle could have stopped but didn't.

Visual aids--preferably dynamic--should be used to demonstrate the effect of front wheel braking upon stopping distance.

(2) Safety of front wheel braking

(a) "Myths" of falling due to front wheel braking in turns and on wet surfaces.

(b) Explain effect of front wheel lock upon stability.

- Front wheel steering needed for balance.
- Locked wheel results in loss of steering control.

(c) Application of front brake on wet surfaces and in turns will not cause a lock up if the brakes are properly applied.

(3) Front wheel braking for normal stops.

(a) Proper use of front brake in an emergency requires:

- Habit--Use of the front brake must be automatic.
- Skill--The front brake must be applied properly.

(b) Appropriate habits and skills can only be developed if front brakes are used on normal stops.

2.2 Proper Braking Technique

The instructor should discuss the following elements of a controlled stopping procedure:

(1) Initiation of brake application

(a) The ability to judge the distance required for normal stops.

(b) Many novices are unsure and tend to start slowing too early, catching following drivers by surprise.

(2) Stopping procedure

(a) Close throttle

(b) Apply both brakes at the same time

- Expose myth of delayed front wheel braking.
- The sooner the front brake is applied the quicker the motorcycle stops.

(c) Ease up on brakes as motorcycle comes to a stop. Brakes tend to grab as momentum is lost.

(3) Maintaining stopped position

(a) On a short stop, most riders prefer to use left foot for support.

- Allows right foot to be used for braking, freeing right hand for throttle control.
- Requires shift to first gear before stopping.

(b) On long stops, most riders prefer to use the right foot for support.

- Allows left foot to use to shift into neutral.
- Shifting into neutral for long stops prevents lurching ahead if clutch lever is inadvertently released.

(c) Brake pressure must be maintained while stopped in order to prevent motorcycle from rolling forward or backward.

3. Shifting 10 minutes

In order to meet time constraints, discussion of shifting during the first classroom session was limited to (1) finding neutral, and (2) shifting into, and accelerating in, first gear. Continued discussion of shifting will deal with the following:

3.1 Reasons for Shifting
3.2 Gear Pattern
3.3 Upshifting
3.4 Downshifting

3.1 Reasons for Shifting

Many students will be unfamiliar with manual shifting of vehicles and why it is required. The instructor should review the following:

(1) Function of gears

To supply engine power in the form of force versus speed.

(2) Low gears supply force for:

(a) Overcoming inertia to put the motorcycle in motion.

(b) Maintaining speed up hills.

(c) Higher gears allow attainment of speed where motion is not resisted by inertia or gravity.

3.2 Gear Pattern

Using a graphic aid, the instructor should illustrate the gear pattern through five gears.

(1) Larger, street bikes generally have five gears.

(2) Smaller bikes and trail bikes generally only have four gears.

3.3 Upshifting

Using visual aids, the instructor should demonstrate the process of upshifting.

(1) Purpose--to accelerate the motorcycle to higher speeds.

(2) Shifting procedure:

(a) Squeeze clutch
(b) Close throttle
(c) Lift shift lever with toe
(d) Release clutch
(e) Open throttle to increase speed
(f) Repeat process

(3) Gear speed ranges

(a) Explain gear range

- Each gear operates over a specific range
- Cannot shift into gear before lower end of range is reached
- Must shift out of the gear before higher end of range is reached

(b) Consult owners manual for gear range

- If equipped with tachometer, a fixed minimum and maximum RPM generally applies to all gears.
- If no tachometer, must use speed ranges.

(c) Student must learn through experience to recognize the sound of appropriate RPM.

(4) Common problems in upshifting

Describe the following:

(a) "Lugging" the engine

- Describe lugging
- Results from shifting too soon
- Must shift back to lower gear and increase engine speed

(b) Exceeding prescribed RPM

- Over-revving
- Can cause engine damage and burn oil

(c) Shifting too slowly

- Motorcycle slows while clutch is disengaged; speed drops below minimum
- Results in lugging
- Must shift quickly

(d) Racing the engine

- Results from failure to close throttle when disengaging clutch
- Can cause clutch wear

3.4 Downshifting

Using visual aids, the instructor will illustrate the process of downshifting while the motorcycle is slowing.

(1) Purpose--To match gears with motorcycle speed range in order to allow acceleration if needed.

(2) Shift procedure

(a) Close throttle
(b) Wait for motorcycle to slow down; use brakes if necessary
(c) Squeeze clutch
(d) Depress gear shift lever
(e) Release clutch immediately

(3) Engine braking

(a) Many books describe use of downshifting to slow the motorcycle

- Clutch is squeezed before motorcycle slows
- Throttle is open slightly to match engine RPM with that of lower gear

(b) This practice will not be used in instruction and is discouraged

- Not good for the engine; it is cheaper to replace the brakes than the transmission
- If not done properly, can lock the rear wheel and cause a skid
- Is too complicated for this stage of instruction

(4) Simultaneous downshifting

(a) Some operators prefer to shift gears all at once either while slowing or after stops
(b) Acceptable if motorcycle is coming to a stop and will not be accelerated
(c) If acceleration is needed, the operator may not know what gear the motorcycle is in

(5) Downshifting problems

(a) Lurching

- Caused by failure to slow the motorcycle down enough before shifting
- Particularly likely to happen in first gear due to the gear ratio
- Need to make sure the motorcycle is in the proper speed range for gear being shifted into

(b) Can't shift into first gear

- Occurs when gears do not mesh
- Release clutch to friction point to move gears
- Squeeze clutch immediately to prevent motorcycle from moving forward
- Squeeze clutch again and depress gear-shift lever

4. Turning 20 minutes

Students have had to turn the motorcycle during the previous range Session. However, they have not learned how to control speed, rate of turn, and lean angle to perform a coordinated turn.

The discussion of physical forces that is called for is intended to show the students the relationships among speed, rate of turn, and lean angle. An understanding of these relationships is not difficult to acquire if appropriate visual aids are used. It is believed that such an understanding facilitates both the learning and retention of procedures involved in performing turns and handling problems when they arise.

The discussion of turning will be divided into the following topics:

4.1 Motorcycle Lean
4.2 Body Lean
4.3 Turning Technique

4.1 Motorcycle Lean

The instructor should explain the interrelation of motorcycle lean, rate of turn, and motorcycle speed. The following outline deals with the interrelationships in terms of the physical forces involved. It may be deleted if time is limited or students are judged to lack interest.

(1) Physical forces

Using graphic visuals the instructor should illustrate the following:

(a) Outward force

Illustrate the outward force acting upon the motorcycle in a turn.

- Show how forces develop
- Show how force varies as a function of rate of turn and speed.

(b) Downward force

Show the downward gravitational force acting upon the motorcycle when it is leaned inward.

(c) Stability

Show how the two forces combine to produce a force in line with the motorcycle.

- When the two forces are equal, the motorcycle is stable.
- When outward force is too great, the motorcycle tends to fall outward.
- When outward force is insufficient, motorcycle tends to fall inward.

(2) Interrelation of forces

The instructor should illustrate the interaction of speed, rate of turn, and lean angle.

(a) Using graphic aids, the instructor should illustrate the effect of varying speed and rate of turn upon required lean angle.

(b) Using pictorial visuals, the instructor should illustrate lean angles for various turns and speeds including the following:

Small Lean
Slow speed, moderate turn,
(e.g., on-ramp to crowded highway).
Fast speed, gentle turn
(e.g., gradual highway curve).

Large Lean
Slow speed, sharp turn,
(e.g., intersection).
Fast speed, moderate curve
(e.g., off-ramp, sharp highway curve).

4.2 Body Lean

To avoid unnecessary complications, body position was omitted from discussion of motorcycle lean. Illustrations would show the operator leaning with the turn, i.e. at approximately the same angle of the motorcycle. At this point, the effect of body lean itself will be discussed.

(1) The effect of body lean

Using graphic visuals, the effect of leaning with the motorcycle should be compared with "leaning out," that is leaning less than the motorcycle.

(a) Leaning out creates less downward force to balance the outward force of the turn.

(b) The motorcycle must be leaned more to make the same turn.

(2) Normal turning

(a) Leaning with the motorcycle enables the operator to handle sharper turns at higher speeds.

(b) Sharp, high speed turns are not encouraged; however, they may become necessary if:

- A curve turns out to be sharper than expected.
- The motorcycle is traveling faster than the operator thought.
- Traffic conditions require a relatively high speed turn.

4.3 Turning Technique

Using pictorial visuals, dynamic or static, the instructor should illustrate the steps involved in a coordinated turn.

(1) Approach the turn at appropriate speed

(a) Adjust speed to rate of turn.

(b) Complete speed adjustment before entering the turn; speed adjustments in the turn may be dangerous (as will be noted momentarily).

(c) The ability to judge the maximum speed at which a turn may be safely entered will be developed with practice.

(2) Lean the motorcycle toward the turn

This process involves coordination of steering and body movement. It is a skill developed with practice and cannot be taught as a procedure.

(3) Turn handlebars toward turn

(4) Lean with the turn

(a) Allow body to lean with the motorcycle; don't "lean into" the turn (i.e., lean more than motorcycle.

(b) Maintain body position by:

- Knees against the gas tank
- Feet on the pegs
- Hands on the handlebars

(c) Keep head erect to aid in perceiving position and direction.

(d) Keep eyes up; look into the turn and not in front of the motorcycle.

5) Coming out of the turn

(a) Straightening up--As the motorcycle nears the end of the turn, the operator adjusts steering to increase the rate of turn, generating an outward force to bring the motorcycle upright.

(b) Straightening out--As the motorcycle nears an upright position, the rider instinctively straightens the handlebars to maintain balance.

(c) Accelerating out--Many riders accelerate to generate additional outward force to help bring the motorcycle to an upright position.

(6) Excessive speed

Using graphic visuals, the instructor should describe the technique of handling exceessive speed in a turn.

(a) Through misjudgment, the operator may enter a curve at a speed that is excessive with the amount of motorcycle lean that has been obtained.

- The excessive outward force will tend to bring the motorcycle to an upright position.
- The rider will feel an inability to "hold the turn" and instinctively tend to swing wide (reduce the turn rate) to maintain stability.

(b) If a wider turn is potentially dangerous--it will cause the motorcycle to leave the lane or the roadway--the following alternatives are available:

- Close the throttle. This will reduce speed causing the motorcycle to lean inward more and allowing a sharper turn to be made.
- Apply the brakes. If absolutely necessary, the brakes may be applied slightly to further reduce speed. Particular care should be taken to avoid locking the rear wheel, since the rear wheel is particularly likely to skid in a turn.
- Adjust steering. It is possible to adjust steering so as to increase the amount of lean and allow a sharper turn to be made. The technique requires a modicum of skill and will be described in Unit III "Street Riding Skills."

5. Starting on an Incline 10 minutes

Using dynamic visuals, the instructor will describe and demonstrate the procedures for starting the motorcycle on a hill.

(1) Starting engine

(a) Use front brake to hold motorcycle

(b) Start engine, using normal kickstart

(2) Accelerate

(a) Put the motorcycle in first gear

(b) Apply foot brake to hold motorcycle while the right hand operates the throttle

(c) Open the throttle slightly more than usual

(d) Release the clutch somewhat more gradually than usual. Quick clutch release may:

- Stall the engine
- Cause the front wheel to lift off the ground

(e) Release the rear brake as the engine takes hold

- Lowering of engine rpm indicates that it is beginning to take hold.
- It may be necessary to increase throttle slightly as the clutch is released.

6. Range Preparation 5 minutes

If time permits, the instructor should describe briefly the activities to take place in the accompanying range Session (1-2-2). Range diagrams should be disseminated so that students may study the range layout and exercise paths.

6.1 Stopping

The students will be required to:

(1) Approach a pair of markers along a straight path.

(2) Determine where to initiate a stopping maneuver in order to come to a smooth stop between the two markers.

(3) Perform a smooth stopping maneuver when coming to a stop between the two markers.

6.2 Shifting

The students will be required to:

(1) Ride around the perimeter of the exercise area.

(2) Upshift to second gear and back to first gear on the straightaway corresponding to the longer dimensions of the area.

(3) Repeat (2) shifting to third gear and back to first gear.

6.3 Turning

The students will perform three turning exercises designed to develop skill in performing coordinated turns.

(1) Left turns, Right Turns

The students will ride around the range area in a counterclockwise and clockwise direction to perform coordinated right turns and left turns respectively.

(2) Left and Right Turns

The students will negotiate one-half of the range area in a countercloskwise direction and the other in a clockwise direction to provide practice and coordinated right and left turns.

(3) Serpentine

The students will negotiate the range area in a large figure "8" so as to practice moving directly from a right turn into a left turn.

MOTORCYCLE SAFETY EDUCATION PROGRAM

UNIT	LESSON	SESSION	TITLE	MODE
I	2	2	Basic Maneuver Skills	Range

PURPOSE

The purpose of this Session is to enable students to develop the skills associated with longitudinal and lateral control of the motorcycle.

CONTENT

This Session consists of the following topics:

1. Stopping at a Predetermined Point
2. Shifting
3. Turning

This Session concludes the introduction of skills and procedures for basic motorcycle operation. The stopping exercise assists students in using speed cues and cues from closure in order to judge when braking should begin to stop the cycle at a predetermined point.

The exercise on shifting assists students in locating gears, operating the shift lever, and coordinating clutch, throttle and shift lever to obtain the desired gear while upshifting and downshifting. The exercise requires upshifting to third gear. It is assumed that anyone with the procedural information and skill to shift to third gear could shift to fourth and fifth gear as well.

The turning exercise continues with those skills required for changing the motorcycle's direction in I-1-3 and required development of skills associated with turning at different speeds, different radii, and turning from a turn.

METHODS

1. Stopping at a Predetermined Point 15 minutes

   (1) Purpose--The purpose of this exercise is to help the students develop skill in regulating brake pressure and judging distances in order to bring the cycle to a smooth stop at a predetermined place.

(2) Range Layout--The range layout should provide a stopping path defined by painted lines or markers. The path should be of sufficient length to permit students to reach a speed of 15 mph before stopping the motorcycle. At one end of the path, a stopping point should be indicated by a clearly observable marker. For a class of 12 students, two paths should be provided. Refer to the illustrative diagram entitled "Stopping."

(3) Exercise Procedure--An instructor and six students are assigned to each of the two braking paths. The students will ride the length of the braking path at about 12 mph. They are to use both brakes to bring the motorcycles to a smooth stop with the front tire between the pair of markers. As soon as a student has stopped, the next student will begin to ride down the line. The first student will return to the starting area. The process continues for the duration of the exercise period.

(4) Operating Procedures-- The students will perform the exercise using the following procedures:

(a) Stabilize speed at 12-15 mph.
(b) Look ahead to stopping area.
(c) Close throttle.
(d) Apply pressure to both brakes to achieve stop in designated area.
(e) Pull in clutch for stop before engine lugs.
(f) Stop smoothly at stop area.

(5) Instruction Points--Students will be observed for the following:

(a) Brake application (too soon or too late).
(b) Braking pressure (smooth stop without skidding).
(c) Use of both brakes (front end dip).
(d) Coordination of controls (closes throttle before braking, pulls in clutch before stopping).

(6) Method--The instructor need only demonstrate the exercise once, after which students may practice individually as desired. The instructor should stand alongside the braking paths.

2. Shifting 15 minutes

(1) Purpose--This exercise is designed to develop the manipulative control skills for shifting. It also provides reinforcement of the basic turning exercises and superimposes the shifting task upon other skills developed in the course.

(2) Range Layout--The range should be laid out so as to allow students to travel a generally circular path, thus making it unnecessary to come to a stop. Refer to the illustrative diagram entitled "Shifting."

(3) Exercise Procedure--The students will ride around the range in single file at about 20 mph. There must be at least a 35-foot separation between motorcycles. Students will shift while on the long dimension of the range, shifting to second and back to first before reaching the turn. They should negotiate each curve at about 5 mph.

Once the students develop proficiency in shifting to second and back to first, they should be instructed to shift up to third and back down to first before they turn.

After going in the same direction for about 10 minutes, students will turn and ride in the other direction.

(4) Operating Procedures--The students will perform the exercise using the following procedures:

Upshifting

(a) Squeeze clutch
(b) Close throttle
(c) Quickly lift shift lever with toe
(d) Release clutch quickly
(e) Open throttle to increase speed
(f) Repeat process

Downshifting

(a) Close throttle
(b) Wait for motorcycle to slow down; use both brakes if necessary
(c) Squeeze clutch
(d) Depress gear shift lever
(e) Release clutch immediately
(f) Keep throttle closed or open slowly

Students should not be instructed to open the throttle to rev the engine while the clutch is disengaged. This is a complex coordination and unnecessary if the brakes are used to slow the motorcycle before downshifting.

(5) Instruction Points--Students will be observed for the following:

Upshifting

(a) Shifts without racing or over-revving engine
(b) Shifts without slipping clutch
(c) Prevents engine from lugging
(d) Maintains course without weaving
(e) Operates controls while focusing attention ahead

Downshifting

(a) Avoids lurching or squeaking rear tire
(b) Shifts one gear at a time (no gang shifting)
(c) Avoids racing engine
(d) Maintains course without weaving
(e) Maintains posture while shifting and in turns
(f) Operates controls while focusing attention ahead

(6) Method--The instructor should demonstrate the procedure at least once, followed by student demonstration in which students individually upshift while passing the instructor. They then repeat the process, downshifting while passing the instructor. Those that exhibit satisfactory performance may practice while those who cannot are given additional instruction and, if necessary, a demonstration.

3. Turning

3.1 Left and Right Turns

10 minutes

(1) Purpose--The purpose of this exercise is to develop turning skills. The exercise incorporates and reinforces skills related to balancing, coordinating controls, and braking and shifting.

(2) Range Layout--The range should be laid out in such a way as to require a series of 90° turns having approximately equal radii. Refer to the illustrative diagram entitled "Left Turns, Right Turns."

(3) Exercise Procedure--Students will ride around the path in single file at about 20 mph. All will ride in the same direction maintaining a 20- to 40-foot separation between motorcycles. They will shift as necessary to avoid lugging or over-revving, and will round the corners at the highest speed at which they feel comfortable. After four circuits, they will be instructed to turn and go the other way.

(4) Operating Procedures--The students will perform the exercise using the following procedures:

(a) Approach turn at appropriate speed
(b) Adjust speed before turn (shift and brake as necessary)
(c) Lean with the turn
(d) Maintain proper posture during turn
(e) Turn back to straight course

(5) Instruction Points--Students will be observed for the following:

(a) Rider posture
(b) Cycle lean
(d) Rider lean
(c) Adjusting speed before turn
(f) Looking ahead through the turning path

(6) Method--The instructor will lead the students once through the exercise and then will observe as students practice it for the duration of the scheduled time period.

3.2 Left/Right Turns 10 minutes

(1) Purpose--The purpose of this exercise is to provide the students with practice in making alternating left and right turns.

(2) Range Layout--Configure the range layouts so as to:

(a) Require alternate left and right turns
(b) Assure that the riders' paths do not cross
(c) Refer to the illustrative range diagram "Left and Right Turns."

(3) Exercise Procedure--Students will ride in single file at about 20 mph. All students will ride in the same direction maintaining a 20-40 foot separation between motorcycles.

(4) Operating Procedures--Not applicable.

(5) Instruction Points--Same as 3.1.

(6) Method--The instructor will lead the students once through the exercise and then will observe as students practice it for the duration of the scheduled time period.

3.3 Serpentine 10 minutes

(1) Purpose--The purpose of this exercise is to develop the skills necessary to allow the student to enter one turn directly from another, i.e. a turn from a turn,

(2) Range Layout--This exercise is most easily accomplished through use of a "serpentine" layout; that is, a line of markers placed approximately 20 feet apart. A circular path should be used to allow continual motion. Refer to the illustrative diagram "Linked Turns."

(3) Exercise Procedure--Students will ride around the path, weaving back and forth between the markers in a serpentine pattern. Twelve students can perform the exercise at one time. An interval of at least 30 feet--the distance between two markers--should be maintained at all times. After the students have developed a degree of proficiency, the markers may be set 15 feet apart.

(4) Operating Procedures--Not applicable.

(5) Instruction Points--Students will be observed for the following:

(a) Coordination of speed and turning to maintain a smooth, rhythmic pattern.

(b) Entering one turn from another without assuming a straight path.

(c) Keeping eyes up.

(6) Method--The instructor should lead the students once through the path that is to be followed, then allow the students to practice.

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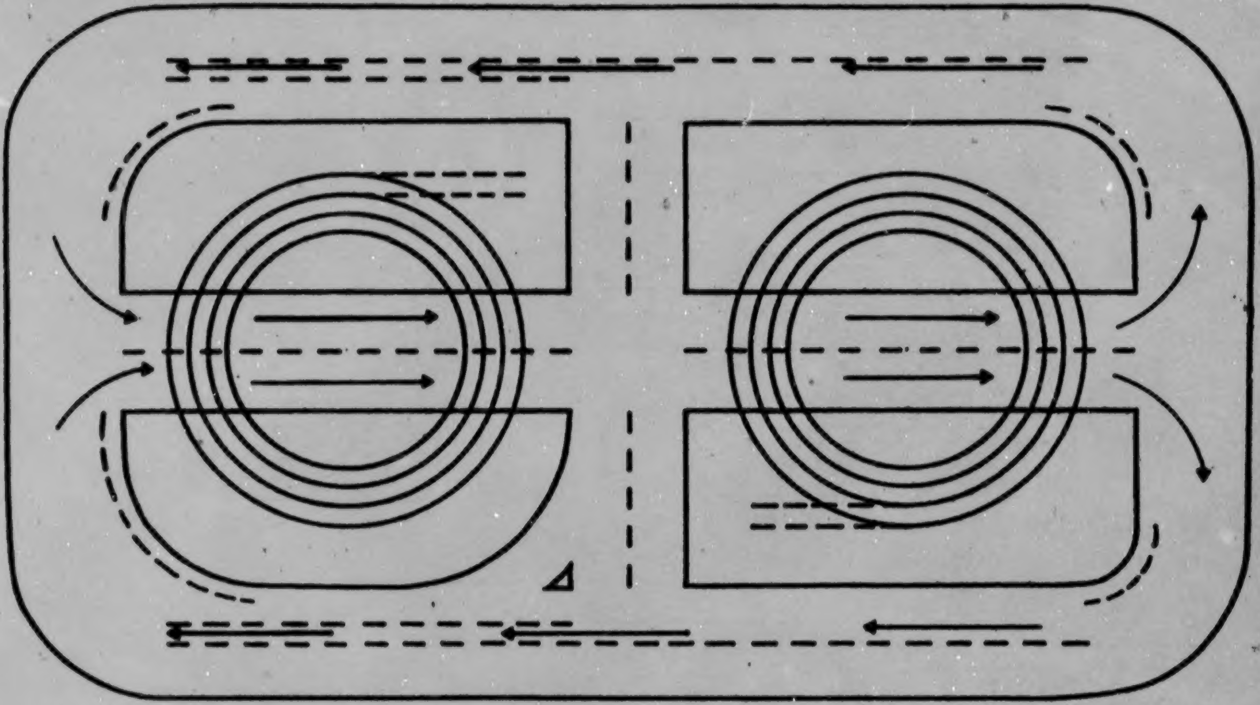
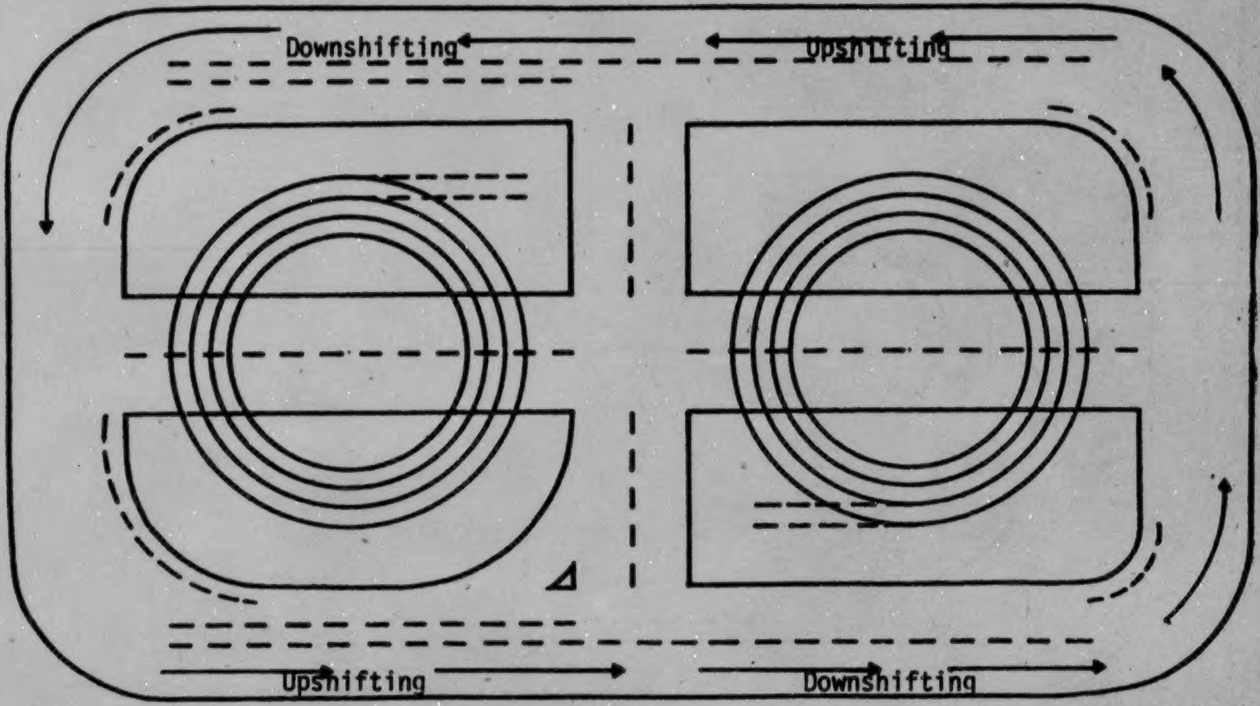
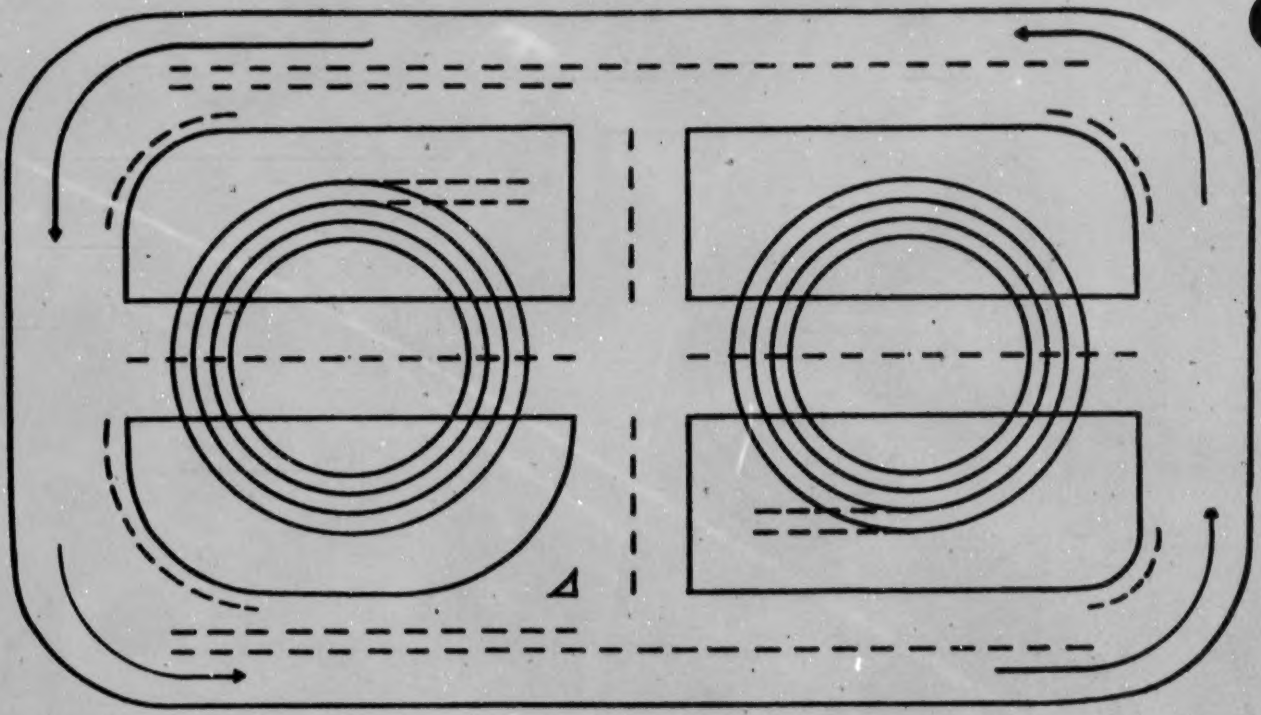
EXERCISE 1 - STOPPING



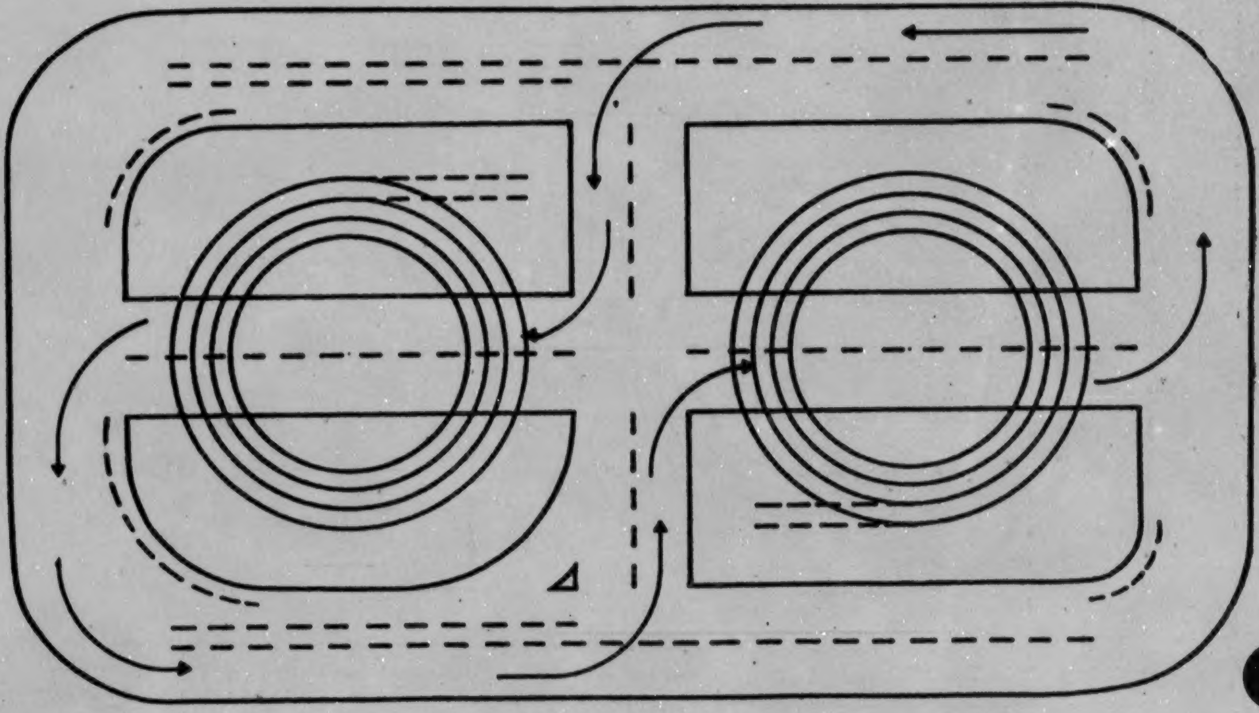
EXERCISE 2 - SHIFTING


Downshifting
Upshifting
Upshifting
Downshifting

EXERCISE 3.1 - LEFT AND RIGHT TURNS



EXERCISE 3.2 - LEFT/RIGHT TURNS



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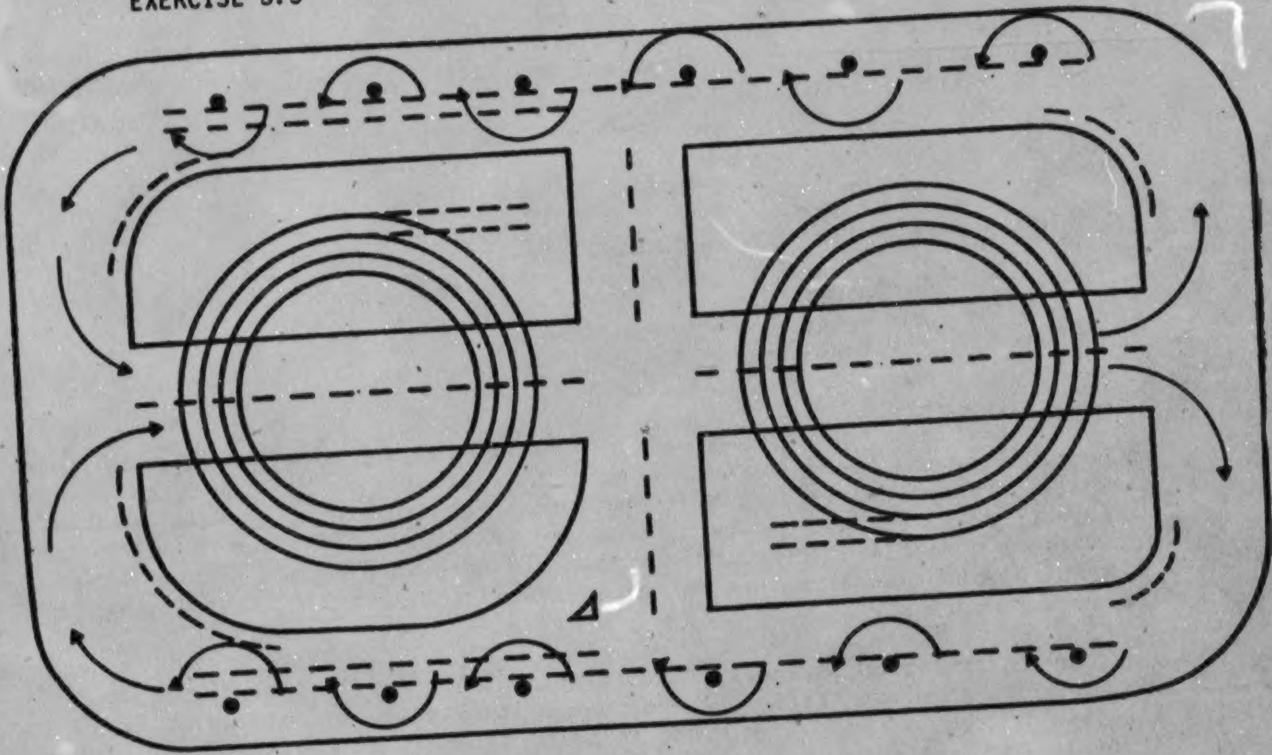
EXERCISE 3.3 - SERPENTINE



UNIT	LESSON	SESSION	TITLE	MODE
I	2	3	Proficiency Development	Range

PURPOSE

The purpose of this Session is to enable the students to further develop the skills associated with longitudinal and lateral control of the motorcycle by riding various travel paths.

CONTENT

This Session consists of the following topics:

1. Stopping
2. Low Speed Operation
3. Turning
4. Starting on an Incline

This Session is provided to allow students to gain additional proficiency in controlling the speed and direction of the motorcycle. In the first three exercises, students are required to perform unplanned stops, execute turns of different radii, operate at low speeds, and practice overall coordination of the various controls. The exercises that are described should not be viewed as requirements themselves but rather as examples of activities through which the requirements may be met.

The "Starting on an Incline" exercise, unlike the first three, deals with a basic required skill. Development of this skill is delayed until the last Session of Unit I in order to allow students to master the clutch-throttle coordination involved in starting on a level surface before facing the formidable challenge of an incline. Including it in a proficiency development session also permits the individualized instructional approach described under "Methods."

FACILITIES

In addition to the requirements identified in Course specifications, the range should provide an incline having the following characteristics:

(1) At least 12 feet in length
(2) At least 6 feet in width
(3) A constant grade of 10-15 percent

If a natural incline such as a hill or driveway is not available, one may be constructed. In addition to meeting the above requirements, a constructed incline must meet the following specifications:

(1) Sturdy construction
(2) High friction surface (e.g., non-skid paint)
(3) A level portion, at least 8 feet in length at the top of the ramp
(4) A down ramp having a grade no steeper than 20%

METHODS

Each of the exercises described should commence with an instructor demonstration intended simply to show how the exercise is to be performed. Students should not require a demonstration of the operating procedures themselves. Following the instructor demonstration, students should practice individually following the exercise procedures.

The exercise "Starting On An Incline" should be conducted in parallel with the first three exercises. Individual pairs of students would be pulled out of the other exercises and sent to the incline area. They would continue operating on the incline until they had mastered the exercise, whereupon they would return to the other exercises.

The use of an individualized approach to instruction in operating on an incline is necessitated by the large variation in instructional time that typically characterizes this activity. Some students will perform correctly the first time, while others will require up to 30 minutes. Scheduling such instruction parallel with the other exercises allows students to take as much time as they need without missing out on essential instruction.

1. Stopping 10 minutes

(1) Purpose--The purpose of this exercise is to help the students develop skill in regulating brake pressure to bring the cycle to a smooth stop using both brakes after an unanticipated command.

(2) Range Layout--The range should be configured as follows:

(a) Two parallel paths, approximately 3 feet in width and at least 50 feet in length.

(b) A straightaway preceding each path and having a length of at least 50 feet.

(c) A return lane that does not cross either of the paths described above.

Refer to the illustrative diagram entitled "Stopping on Command."

(3) Exercise Procedure--One student at a time will proceed down the straightaway at 10-15 mph. As the student approaches or enters the 3-foot path, the instructor will give a hand signal. The student should respond by coming to a smooth stop. Upon completing the stop, the student should start again and return to the original position by way of the return path. The second student can start as soon as the first student clears the path. The point at which the command is given should be changed on a random basis so that students cannot anticipate the command.

(4) Operating Procedures--The same as Session I-2.2, Exercise 1, "Stopping."

(5) Instruction Points--Students will be observed for the following:

(a) Brake application (too late)
(b) Brake pressure (smooth stop without skidding)
(c) Use of both brakes (front end dip)
(d) Coordination of controls (closes throttle before braking, pulls in clutch before stopping)

(6) Method--The instructor should demonstrate this exercise, using the assistant instructor or a student to give the stopping signal. This demonstration may be followed by student practice.

2. Low Speed Operation 10 minutes

(1) Purpose--The purpose of this exercise is to help students develop proficiency in control coordinations needed to maintain balance at low speeds.

(2) Range Layout--The range layout will be the same as that used in Exercise 1 "Stopping," except for the addition of a marker at the beginning of the path. Refer to the illustrative diagram "Slow Ride."

(3) Exercise Procedure--Students will ride the 3-foot path as follows:

(a) Operate at a speed that will require at least one second for each 4 feet of travel.

(b) Remain entirely within the 3-foot path.

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(c) Maintain balance without allowing the feet to touch the ground.

(d) One student will approach the path as soon as the preceding student completes the exercise.

Students should only be required to meet the time standard. The exercise should not be presented as a "race" since that tends to encourage operating at speeds that are so slow that they require unnatural and unrealistic riding techniques.

(4) Operating Procedures--Students will perform the exercise using the following procedures:

(a) Slip the clutch as necessary to operate slowly without stalling the engine.

(b) Feather the rear brake where necessary to slow down.

(c) Maintain balance through steering and body lean.

(d) Maintain a fixed seat position, neither standing on pegs nor moving from side to side on the seat.

(5) Instruction Points--Students will be observed for the following:

(a) Slipping the clutch without over-revving or allowing the engine to lug.

(b) Feathering the brake to avoid coming to a complete stop.

(c) Remaining within the path.

(d) Unnatural motions including fanny twitching, rapid steering reversals.

(6) Method--The instructor will provide one demonstration of the exercise, performed according to the correct operating procedure.

Following the instructor demonstration, students will immediately proceed to practice in turn. The instructor should record time and, where necessary, signal students to: slow down, speed up, remain on path, keep feet on pegs.

3. Turning

3.1 90° Turns of Varying Radii — 10 minutes

(1) Purpose--The purpose of this exercise is to develop the skills necessary to make right and left turns.

(2) Range Layout--The range should be configured to create four or more 90° turns with radii ranging from approximately 10 feet to approximately 25 feet. An illustrative range diagram "90° Turns of Varying Radii" is provided.

(3) Exercise Procedure--Students will ride around the designated area adjusting speed appropriately for each turn. The students will maintain proper posture and lean their bodies and the cycles appropriately. As they clear the turn, they will accelerate and follow the radius.
At the end of each 90° turn, the student will straighten the cycle and ride to the next curve. The direction of travel should be reversed periodically so that the students make both left and right turns.

(4) Operating Procedures--Turning is a perceptual motion skill and cannot be described in procedural terms.

(5) Instruction Points--Students will be observed for the following:

(a) Rider posture
(b) Cycle lean
(c) Rider lean
(d) Increases speed during turn

(5) Method--See Session introduction.

3.2 90° Turns of Varying Radii from a Stopped Position — 10 minutes

(1) Purpose--The purpose of this exercise is to develop the skills necessary to make right and left turns from a stopped position.

(2) Range Layout--The range should be configured as in 3.1 except for the addition of markers at each turn.

(3) Exercise Procedure--Students will ride up to each curve and stop at the marker. The students will then accelerate and follow the radius of the curve. At the end of the 90° turn, the students will straighten up their motorcycles

and ride to the next curve. The students must lean into each turn and increase their speed while in a turn. The direction of travel should be reversed periodically.

(4) Operating Procedures--Not applicable. See 3.1.

(5) Instruction Points--Students will be observed for the following:

(a) Rider posture
(b) Cycle lean
(c) Rider lean
(d) Increased speed during turn.

(6) Method--See Session introduction.

3.3 Linked Turns of Varying Radii 10 minutes

(1) Purpose--The purpose of this exercise is to develop the skills necessary to make a series of turns of various radii when the second turn is initiated before the rider completes the first turn--a turn from a turn.

(2) Range Layout--The range should be configured as follows:

(a) Two areas for turning.
(b) Random distances between turning points ranging from 10 to 20 feet.
(c) Be offset at various distances from the center line up to 20 feet.
(d) At least 5 turning points on the path of travel.
(e) A return lane that does not cross the exercise area.

An illustrative diagram "Linked Turns of Varying Radii" is provided.

(3) Exercise Procedure--The students should be divided into two groups. One group is assigned to each turning area. The students will ride down the turning area and adjust their speed as appropriate for each turn. The students should pass to the left of the markers on the left side of the center line and to the right of the markers on the right side of the center line. The students will brake or shift as necessary for each turn. The students will maintain the proper posture and lean their bodies and the motorcycles at each turn. As soon as a turn is completed, the students will continue on to the next turn.

(4) Operating Procedures--Not applicable. See 3.1.

(5) Instruction Points--Students will be observed for the following:

(a) Rider posture
(b) Cycle lean
(c) Rider lean
(d) Speed adjusted before turning point

(6) Method--See Session introduction.

3.4 Turning in Tight Quarters 10 minutes

(1) Purpose--The purpose of this exercise is to allow students to develop proficiency in skills involved in making turns in a small area.

(2) Range Layout--The range should be configured as follows:

(a) One pair of markers for each student.
(b) The markers in each pair approximately 40 feet apart.
(c) Each pair approximately 30 feet apart to prevent students from interfering with one another.

Refer to illustrative diagram "Turns in Tight Quarters."

(3) Exercise Procedure--The students will ride around the two markers in a figure 8 pattern. As they successfully complete the turns, the instructor will move the markers closer together. This will continue until the distance between the two markers is as small as the students can handle.

(4) Operating Procedures--Not applicable. See 3.1.

(5) Instruction Points--Students will be observed for the following:

(a) Rider posture
(b) Cycle lean
(c) Rider lean

(6) Method--See Session introduction.

4. Starting on an Incline

(1) Purpose--The purpose of this exercise is to enable students to develop the skills needed in starting a motorcycle on an incline.

(2) Range Layout--This exercise will take place on an incline as described under "Facilities" in the introduction to this Session.

(3) Exercise Procedures--Students will be removed from the preceding exercises in individual pairs throughout the Session. One student in the pair will be instructed to bring the motorcycle to a stop part way up the incline (both wheels must be in the incline) and turn the engine off. The engine will then be restarted and the motorcycle will be accelerated the rest of the way up the incline.

Once the first student leaves the incline, the second student will be signalled to move into position. The second student will then perform the same exercise while the first student circles around and returns to the base of the incline. The two students will alternate performing the exercise under the supervision of the instructor.

Once students are able to perform the task acceptably, they will be asked to bring the motorcycle to a stop after getting underway, either (a) at the top of a natural incline or (b) on the down ramp of an artificial incline. This exercise will force students to control acceleration.

(4) Operating Procedures--Students will perform the exercise using the following procedures:

(a) Use the front brake to hold the motorcycle while starting the engine.
(b) Put the motorcycle into first gear.
(c) Switch to the footbrake to hold the motorcycle while the right hand operates the throttle.
(d) Open the throttle slightly more than usual.
(e) Release the clutch gradually, opening the throttle slightly at the same time.
(f) Release the footbrake as the engine takes hold.

(5) Instruction Points--Students will be observed for the following errors:

(a) Allowing the motorcycle to roll to the bottom of the incline while attempting to start the engine.

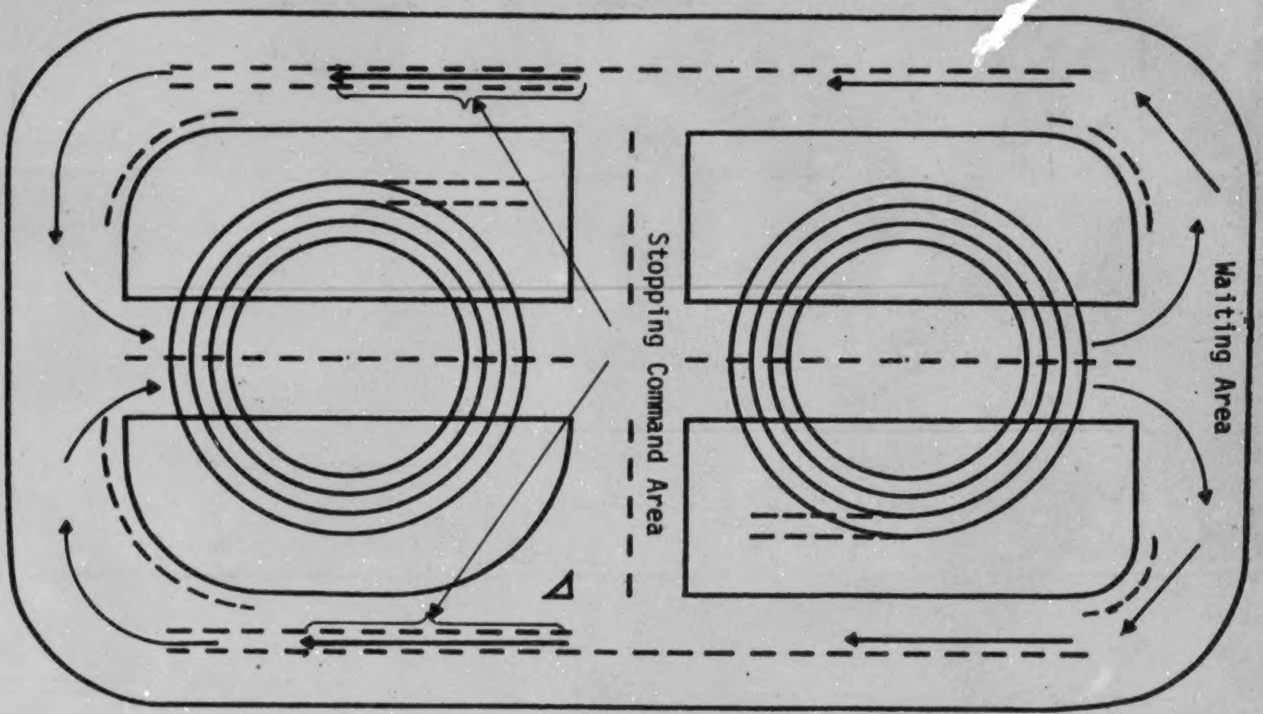
(b) Using the front brake to hold the motorcycle while accelerating (i.e., attempting to manipulate brake and throttle with the same hand).
(c) Insufficient throttle application.
(d) Releasing the clutch too abruptly, resulting in a stall.
(e) Allowing the motorcycle to roll back more than a foot during the attempt to accelerate.
(f) Dabbing the foot to maintain balance while moving up the incline.

(6) Method--The instructor should stand on or next to the incline at the point where the motorcycle is to be stopped. Prior to the first trial, students may be asked to describe the correct procedure to make sure they know what to do. The instructor should provide whatever guidance is necessary to assist the student in getting underway and should provide a critique when the student returns for the next trial.

A student who is unable to master the coordination involved may be allowed to back down until only the front wheel is on the incline. This will in effect reduce the grade and make the task easier.

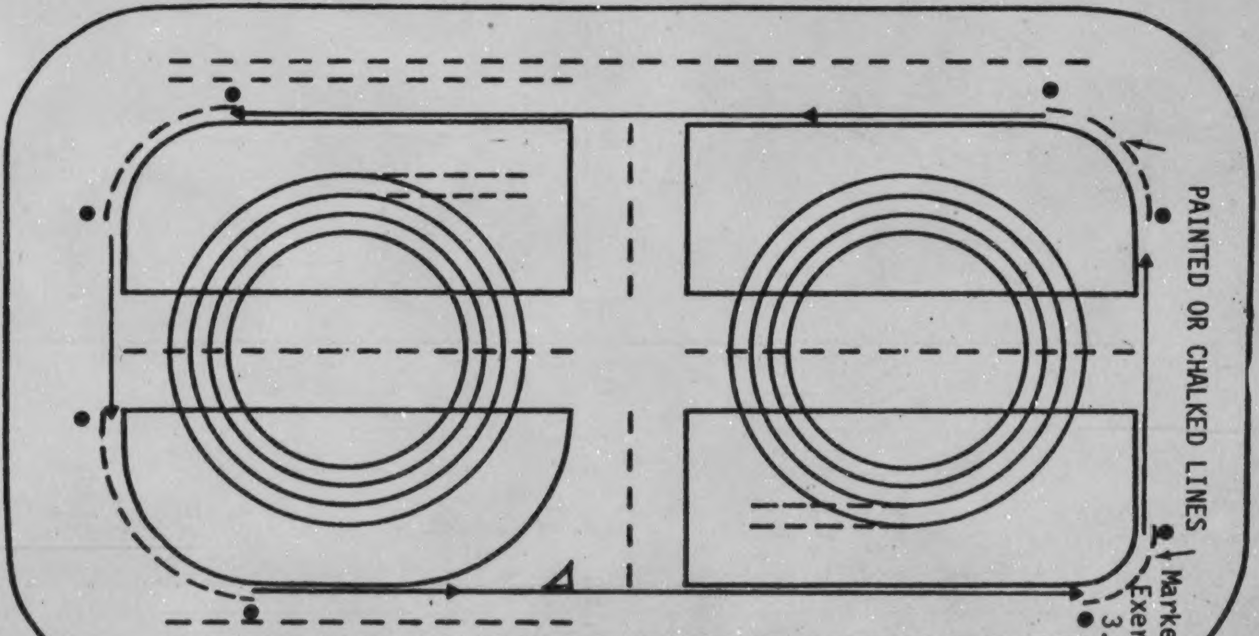
A student who is still unable to get the motorcycle underway should practice starting the motorcycle on a level surface in second gear. This will simulate the clutch-throttle coordination involved in starting on an incline without the need to coordinate brake application. Meanwhile, the incline will be available to another pair of students.

EXERCISE 1 - STOPPING ON COMMAND. EXERCISE 2 - SLOW RIDE

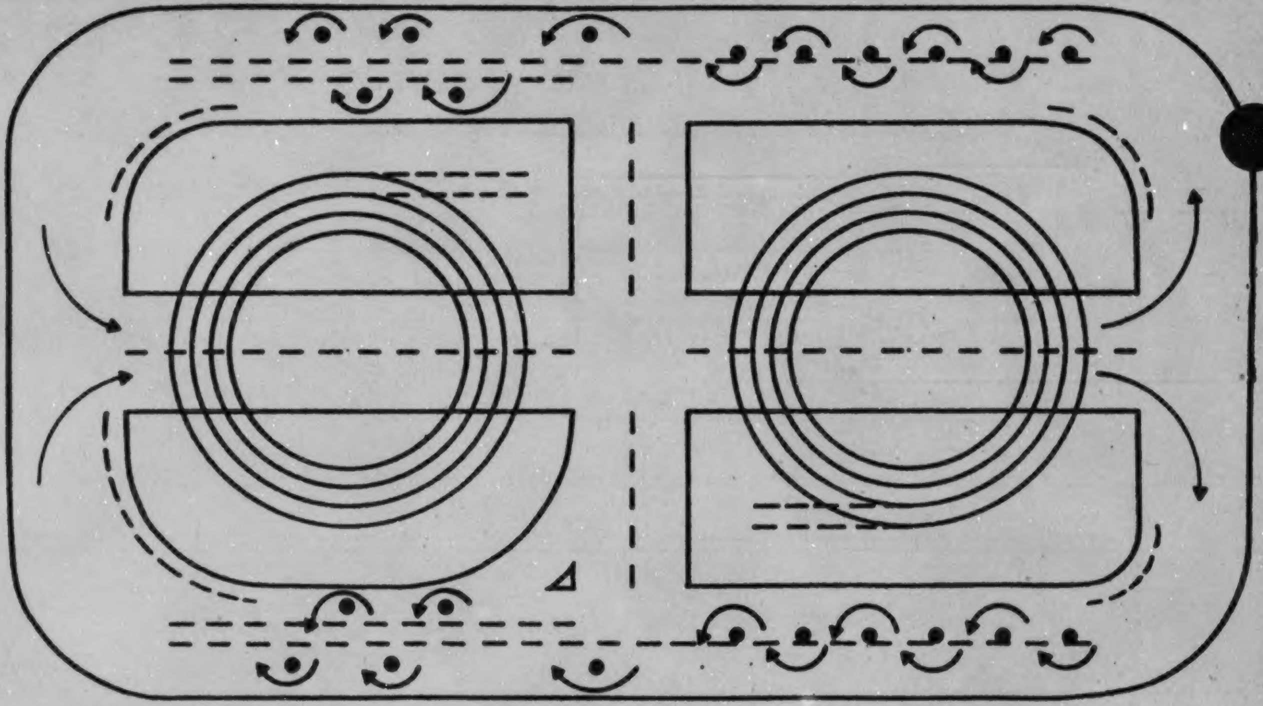

Stopping Command Area
Waiting Area

EXERCISE 3.1 - 90° TURNS OF VARYING RADII

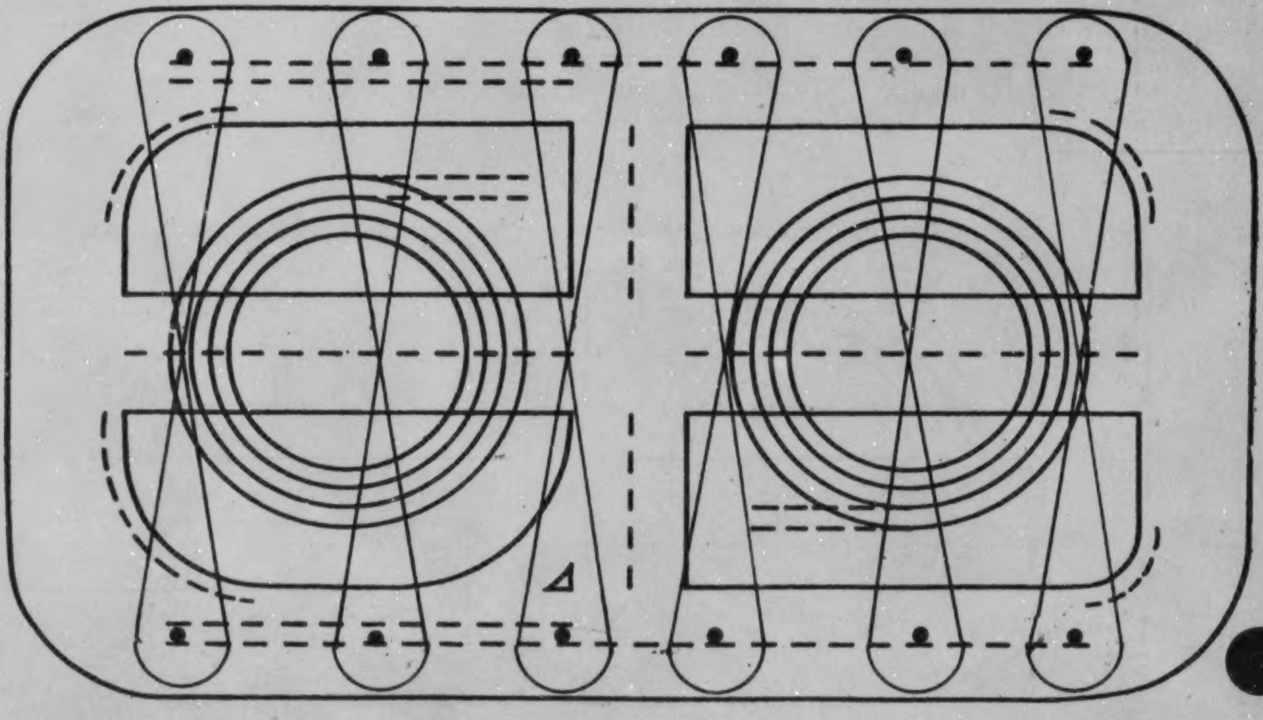
EXERCISE 3.2 - 90° TURNS OF VARYING RADII FROM A STOPPED POSITION


PAINTED OR CHALKED LINES
Markers for Exercise 3.2 only.

EXERCISE 3.3 - LINKED TURNS, VARYING RADII



EXERCISE 3.4 - TURNING IN TIGHT QUARTERS



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UNIT II. STREET RIDING PRINCIPLES

PURPOSE

The purpose of this Unit is to allow students to gain the knowledge that will enable them to apply the basic control skills acquired in Unit I to requirements of the roadway and traffic environment.

CONTENT

Lesson 1 - Seeing and Being Seen

- Session 1 - Seeing: Principles (Classroom)
- Session 2 - Being Seen: Principles (Classroom)
- Session 3 - Seeing and Being Seen: Application (Range)

Lesson 2 - Responding to Traffic Characteristics

- Session 1 - Responding to Traffic Characteristics: Principles (Classroom)
- Session 2 - Responding to Traffic Characteristics: Application (Range)

Lesson 3 - Responding to Roadway Characteristics:

- Session 1 - Responding to Roadway Characteristics: Principles (Classroom)
- Session 2 - Responding to Roadway Characteristics: Application (Range)

Lesson 4 - Street Riding Strategies

- Session 1 - Riding Strategies: Principles (Classroom)
- Session 2 - Beginning Street Riding (Street)
- Session 3 - Intermediate Street Riding (Street)

This Unit focuses primarily on the development of those knowledges that will enable students to transfer the basic skills acquired in Unit II to the potentially hazardous roadway and traffic environment. Knowledge development takes place through a series of classroom activities in which students both acquire knowledge of street riding principles and gain practice in applying these principles through classroom problem solving exercises. Each Classroom Session is followed by a Laboratory Session in which students superimpose principles of street operation on basic control skills.

The Unit also provides the additional proficiency in basic skills that students need in order to undertake the development of higher level skills in Unit III. Experience in driver education has shown that attempts to develop high level manipulative skills before basic skills are mastered tend to be unproductive.

The sequence in which the various street riding principles are introduced is dictated largely by the requirements of range instruction. Principles of Seeing and Being Seen involve individual street activities and are therefore introduced before students are exposed to the complex interaction involved in applying traffic related principles.

The Roadway Session was scheduled last so that the time-consuming activities involved in preparing the range for roadway related instruction would only occur once.

PREREQUISITES

Many of the performances required in safe street operation are essentially the same as those involved in operating an automobile or any other motor vehicle. These common vehicle operating principles should be learned prior to entry into street riding instruction to allow Unit II instruction to concentrate on those activities that are specific to motorcycles. Fulfillment of both Unit prerequisites may be assessed in any of several ways, including the following:

- Completion of an acceptable education program such as driver education, defensive driving, or driver improvement.
- A minimum level of experience such as one year or 10,000 miles.
- Satisfactory performance on a written and performance test.

Students will also have to meet performance objectives of Unit I, prior to the On-Street phase of Unit II. However, attainment of such performance objectives is not a prerequisite for entering into Classroom or Range instruction.

METHODS

Since Unit II focuses primarily upon knowledge acquisition (safe riding principles), the emphasis is on classroom instruction. The function of laboratory instruction is primarily to allow the application of knowledge acquired in the classroom.

Classroom Instruction

Classroom instruction for Unit II consists primarily of the following:

Review--Classroom review of safe riding principles initially acquired through independent study of student material.

Information Presentation--Illustration of the consequences of failure to employ safe riding principles.

Problem Solving Exercises--Student selection of speed and position responses to various traffic situations described by the instructor or depicted through visual aids.

Range Instruction

Range instruction consists primarily of exercises in which students apply safe riding principles learned in the classroom in response to simulations of the roadway traffic environment. These exercises are intended to help students superimpose safer operating principles upon the basic control skills in a controlled manner and within a relatively safe environment.

The Range Sessions also serve to allow students to develop proficiency in basic control procedures themselves. Experience shows that relatively few true neophytes are prepared to take to the street with only the six hours of laboratory instruction called for in Unit I. The value of the types of exercises called for in Unit II is not well established since they have been employed in relatively few programs. Most courses simply devote additional time to the same types of exercises described in Unit I.

On-Street Instruction

Unit II terminates in an On-Street Session. Because of the potential hazard involved, many programs do not offer on-street instruction. In some cases, the limitation arises from an inability to obtain liability insurance, while in other cases it is simply contrary to policies of the host agency (e.g., school). Some States do not issue instruction permits.

A requirement for on-street instruction in the Specifications is based upon the following:

(1) Many critical performances cannot be practiced except in the actual roadway/traffic environment, e.g., hills, curves, bridge gratings, and complex traffic patterns.

(2) The potential hazard of the street environment makes it particularly important that a rider's initial exposure to it occur under the supervision of an instructor who can offer some protection by selecting appropriate routes, and preventing certain unsafe behaviors.

(3) The presence of an instructor often allays some of the anxieties that typically accompany the first exposure to traffic.

(4) Operation in the street environment allows an instructor to detect deficiencies that might otherwise go unnoticed.

The On-Street Session scheduled for this Session would take place along a route that has good roadway surface conditions and little traffic.

MATERIALS

Student Materials

In addition to Student Materials identified in the Course Specifications requirements for Unit II Student Materials include the following:

(1) Situational Material--Materials that picture or describe traffic and roadway situations which allow students to apply informational content and a self-practice mode.

(2) Street Procedures--Procedures to be employed in on-street instruction (Session II-4-2)

(3) Administration--Information concerning requirements for permits and licenses for students not enrolled in Unit I.

Teacher Materials

Requirements for Unit II Teacher Materials include, in addition to that identified in Course Specifications, the following:

(1) Route Selection Procedures--Guidance in selecting routes for the On-Street Session (Session II-4-2).

(2) Situational Guidance--Guidance in conducting problem-solving exercises using roadway and traffic situations.

(3) Administrative Requirements--Information concerning requirements relating to permits, licenses, vehicle registration, and vehicle inspection.

Instructional Aids

Specific requirements for instructional aids are identified in the Session Specifications. One type of aid that is required to support classroom instruction in all sessions is a problem-solving aid--that is, a series of visual or audiovisual aids depicting traffic situations and having the following characteristics.

(a) Capable of allowing students to determine the appropriate response.

(b) Capable of being stopped in order to allow time for response and discussion.

(c) Limitation of any soundtrack content to information necessary to clarify the nature of the situation, but not providing informational content that would interfere with its use in a problem-solving mode.

(d) A sequence of situations that generally parallels the structure of the Unit to allow use of the aid without having to skip from one portion to another.

EQUIPMENT

In addition to the equipment items identified in the Course Specifications, the following equipment requirements are imposed by Unit II instruction:

(1) Motorcycles--In addition to meeting Course Specifications, motorcycles must have the following characteristics:

(a) Accessories--The motorcycle must be equipped for street operation including the following:

- Lights (head, tail and stop).
- Turn indicators
- Mirrors
- Horn

(b) Size--The motorcycle must meet minimum engine size or horsepower requirements imposed by the State for street operation.

(c) Administrative Requirements--Motorcycles must meet State and local administrative requirements covering registration and inspection.

(d) Insurance--Insurance policies must cover street operation and meet the minimum levels of coverage for bodily injury and propery damage imposed by the State.

(2) Projection Equipment--Where motion picture films are to be used in problem-solving or demonstration exercises, it is desirable that the equipment have the following characteristics:

(a) Variable frame rate to allow action to be slowed down.

(b) A stopframe capability to halt action for student responses and discussion.

(c) A reverse direction capability to allow situations to be reviewed.

(3) Student Response Devices--A device capable of allowing students to indicate individually their selection of responses to classroom and problem-solving exercises would facilitate instruction of street riding principles. The following alternative approaches would meet the requirement:

(a) Response cards, answer sheets, or other paper-pencil means of displaying the selected response.

(b) Electromechanical responders that register the students' selection of a particular response.

(c) Simulated motorcycle controls through which students indicate a selection of a response.

The advantage of simulated motorcycle controls is that students can be called upon to respond continuously, thus making it unnecessary to ask specific questions. Often simply asking a question calls attention to aspects of a situation that students may not otherwise notice. If the question is of a multiple choice type, the student only has to recognize proper responses in a list of alternatives rather than having to recall them.

The purpose of the simulated controls would be simply to provide a mechanism by which students could indicate their selection of responses to a particular roadway/traffic situation. They would not be designed to simulate motorcycle control tasks.

To allow the student to indicate choice of responses, the following controls would be required:

- Swivelling handlebars to indicate a decision to change position.
- Throttle and brake to indicate a decision to change speed.

- Horn and turn signals to indicate choice of communication response.

These requirements could be fulfilled with a simple desk top unit consisting of a handlebar with a throttle, brake, horn, and turn indicator. A foot brake is unnecessary since students are instructed to use the hand brake in all stops. A clutch is not required, although a dummy clutch could be provided to avoid disruption of the students' normal response.

FACILITIES

The Range Facilities set forth in Course Specifications are required to support instruction in this Unit. In addition, appropriate street routes must be selected to support on-street instruction. Route requirements are described in Session II-4-2 "Street Riding Strategies: Application I" and Session II-4-3 "Street Riding Strategies: Application II."

PROFICIENCY ASSESSMENT MEASURES

As noted in Unit I specifications, a basic skill test, although functionally a part of Unit I, would be administered during Unit II immediately prior to the first on-street session (II-4-2). In addition, an assessment of proficiency relative to attainment of Unit II objectives should be given at the end of Unit II. It would be made a part of the final session of the Unit (II-4-3) and would assess the following critical motorcycle performances:

1. Observation
   (a) Headchecks at intersections.
   (b) Over-the-shoulder checks on lane changes
   (c) Rearview mirror checks:
   - Periodically
   - On speed reductions

   (d) Looking around obstructions at blind intersections.
2. Signals
   (a) Hand or electric signals on direction changes.
   (b) Hand or flashing brake signals on unexpected speed reduction.
3. Speed
   (a) Adherence to legal limits.
   (b) Reduce speed where visibility is restricted (e.g., blind intersections).
   (c) Speed reduction in the presence of potential traffic hazards, including intersecting vehicles, converging vehicles, and left-turning vehicles.
   (d) Maintaining maximum safe speed prior to leaving a stream of traffic.

4. Positioning

(a) Following distance.
(b) Lane position relative to the following:
  - Potential vehicle hazards including intersecting oncoming, left turning, overtaking, converging and parked vehicles.
  - Surface conditions, including areas of reduced traction and uneven surfaces.
  - Following vehicles (i.e., protection against lane sharing).
  - Observation at intersections.
  - Adjacent vehicles (i.e., avoiding lane sharing).
(c) Lane use and position relative to:
  - Entering and leaving the highway.
  - Starting and completing turns.
(d) Longitudinal position relative to:
  - Adjacent vehicles (i.e., blindspot).
  - Stopped vehicles.

5. Gap Judgement

(a) Crossing traffic.
(b) Entering traffic.
(c) Merging with traffic.
(d) Turning across traffic.
(e) Changing lanes.

MOTORCYCLE SAFETY EDUCATION PROGRAM

UNIT	LESSON	TITLE
II	1	Seeing and Being Seen

PURPOSE

The purpose of this Lesson is to enable the motorcycle operator to see, and be seen by other road users.

OBJECTIVES

Performance Objectives	Knowledge and Skill Objectives
SEEING	
Seeing Ahead	
Scanning--The student must continuously observe the roadway and roadsides 10-15 seconds ahead and observe rear view mirrors every few seconds.	The student must know the importance of proper scanning in early identification of hazards.
Signs--The student must observe signs, markings, and landmarks needed to maintain appropriate speed, utilize appropriate lanes, and reach the intended destination.	
Roadway--The student must observe the roadway configuration (i.e., hills and curves) and surface characteristics.	The student must know the general effect of various surface characteristics upon the ability to maintain balance and control.
Lead Vehicles--The student must observe vehicles ahead for changes of speed and direction.	The student must know the accident potential arising from unexpected slowing and braking of lead vehicles.
Oncoming Vehicles--The student must observe the movement of oncoming traffic for changes in direction.	The student must know the accident potential arising from unexpected lateral movement of oncoming vehicles.
Headlights--At night, the student must operate with the headlight on high beam except when encountering oncoming traffic or following another vehicle.	The student must know the limitation upon visibility imposed by darkness, and the effect of high beams in improving visibility.

Performance Objectives	Knowledge and Skill Objectives
Seeing to the Side	
Adjacent Vehicles--The student must observe adjacent lanes by means of rearview mirrors and head checks when negotiating lateral movements including lane changes, entering roadways or merging into highways.	The student must know the area not observable by eye movements or mirror checks (i.e., blindspot). The student must know possible effects of head checks on the ability to detect headway changes and to maintain directional control.
Intersection--The student must look to the side when approaching intersections (i.e., any point at which other road users may cross or enter the motorcycle's path).	The student must know critical locations where other road users may enter the motorcycle's path, including cross streets, entrances, exits, off-street areas, railroad crossings, crosswalks and animal crossings.
Seeing Behind	
Mirror Adjustment--The student must adjust mirrors for most effective rearward visibility.	The student must know the nature of the rearward view from properly adjusted mirrors.
Following Vehicles--The student must check vehicles behind in rearview mirror periodically and whenever slowing, stopping, turning, or entering or leaving a roadway.	The student must know the potential hazard created by overtaking vehicles and vehicles following too closely.
BEING SEEN	
Visibility Aids--The student must use the horn, lights, and high visibility attire to make other road users aware of the motorcycle's presence.	The student must know the effect of the horn, lights, and high visibility attire on the detectability of the motorcycle.
Positioning--The student must be able to select the lane and position within the lane that will maximize the motorcyclist's detectability to other road users.	The student must know the lanes and positions which maximize the motorcyclist's detectability to other drivers, riders, pedestrians, and bicyclists, at intersections, when meeting, passing, being passed, turning, merging, following, and parking.

Performance Objectives	Knowledge and Skill Objectives
Position--The student must adjust following distance and lane position to maximize the ability to observe when following other vehicles, leaving parking spaces, making U-turns, and crossing streets where visibility is obstructed.	
Signalling--The student must signal any lane change, turn, or speed reduction.	The student must know the correct point at which to initiate signals. The student must know the effect of turn signals upon the motorcycle's detectability. The student must know hand signals and their effect upon other road users.
Cancelling Signals--The student must cancel turn signals upon completing any direction change.	The student must know the effect of an uncancelled turn signal upon other drivers.

CONTENT

The above objectives are met through:

(1) Session 1 - Seeing: Principles (Class)

(2) Session 2 - Being Seen: Principles (Class)

(3) Session 3 - Seeing and Being Seen: Application (Range)

MOTORCYCLE SAFETY EDUCATION PROGRAM

UNIT	LESSON	SESSION	TITLE	MODE
II	1	1	Seeing: Principles	Classroom

PURPOSE

The purpose of this Session is to communicate the observational procedures involved in enabling the motorcyclist to see other road users.

CONTENT

This Session consists of the following topics:

1. Introduction to Safe Street Operation
2. Seeing Ahead
3. Seeing to the Side
4. Seeing Behind

This Session provides an introduction to procedures for safe street operation as well as a discussion of the procedures involved in seeing other vehicles. Instruction concerned with "Seeing" focuses upon observational procedures intended to assure that the motorcycle operator gets a good view of the roadway and other road users. It is not concerned with how the operator reacts to what is observed. Instruction is highly visual and involves extensive use of pictorial visuals to:

(1) Illustrate the need for proper observational procedures.
(2) Illustrate the view obtained through use of correct observational procedures.
(3) Illustrate the benefits of various procedures designed to enhance visibility.
(4) Develop skill in judging distance in convex mirrors.

MATERIALS

Student Materials

See Course Specifications.

Teacher Materials

See Course Specifications

Instructional Aids

Instructional aids required in support of Session introduction include static or dynamic visual aids capable of illustrating the following:

(1) The need for distance scanning in detecting potential hazards.

(2) The effect of the following upon the ability to see ahead:

  (a) Lane position behind vehicles.
  (b) Following distance behind a large vehicle.
  (c) Lane position entering a curve.
  (d) Use of high beams.

(3) The effect of the following on ability to see intersecting vehicles:

  (a) Lane position.
  (b) Edging close to blind intersection.
  (c) Waiting for cross traffic to clear.

(4) Proper mirror adjustment.

(5) The effect of convex mirrors on distance judgment.

(6) The use of headchecks and motorcycle angle in enhancing rearward visibility.

METHODS

1. Introduction to Safe Street Operation

1.1 Hazards of Street Operation

(1) Nature of Problem

  (a) Fatality Rate

  - Two times the auto rate, on a per vehicle basis
  - Four times the auto rate, on a per mile basis

  (b) Victims

  - Almost half of accidents occur in the first year of riding.
  - Findings suggest experience/ability factor.

(2) Contributing Factors

(a) Vulnerability.

- Operator not protected.
- Most multi-vehicle accidents result in injury.

(b) Undetectability.

- Motorcycle is hard to see.
- Motorcycle operator must be responsible for making himself seen.

(c) Instability.

- Balanced on two wheels.
- Falls result from roadway conditions, improper operation.

(d) Maneuverability.

- Can turn more quickly than an automobile.
- Can go places where an automobile cannot.
- Maneuvers often catch drivers by surprise.

1.2 Street Operating Procedures

Unit II deals with the way the motorcycle can be operated to accomplish the following:

(1) Seeing--Being able to spot potential hazards in time to respond safely.

(2) Being Seen--Being able to make the motorcycle observable to other road users.

(3) Traffic--Maintaining a sufficiently great distance from other vehicles to be able to respond to unanticipated acts of other drivers.

(4) Roadway--Being able to identify and respond to potentially hazardous roadway conditions.

1.3 Unit Overview

The instructor should provide a brief overview of Unit II.

(1) Topics.

(a) Each of the above set of procedures constitutes a Lesson.

(b) Each Lesson will include:

- A Classroom Session in which procedures will be discussed.
- A Range Session in which procedures will be applied in exercises designed to stimulate roadway and traffic situations.

(2) Street Riding.

(a) The last Session will take place in the street environment.

(b) Students must demonstrate mastery of basic control skills before being allowed on-street.

(c) Students must meet State permit/license requirements.

1.4 Session Overview

The remainder of the Session will involve discussion of procedures for observing so as to spot potential hazards.

(1) Seeing Ahead

(2) Seeing to the Side

(3) Seeing Behind

2. Seeing Ahead

2.1 Importance of Early Hazard Detection

Using appropriate pictorial visuals, the instructor should illustrate the importance of detecting potential hazards early.

(1) Allows time to respond.

(a) Avoids need for sudden stop--danger of being rear-ended.

(b) Avoids need for sudden lane change--danger of being struck by an adjacent vehicle.

(2) Allows detection of "hidden" hazards.

  (a) Observes road users moving between parked cars, behind trees, etc.

  (b) Observes movement of automobile occupants.

2.2 Distance Scanning

Using pictorial visuals, the instructor should illustrate proper distance scanning.

(1) Looks well ahead.

  (a) 10-15 seconds.

    - About one block in the city.
    - About one-quarter mile on the open road.

  (b) Vehicles--Signs of direction or speed change.

    - Turn indicators.
    - Brake signals.

  (c) Roadway surfaces.

    - Slippery surfaces (e.g., water, gravel).
    - Objects in roadway (e.g., muffler).

(2) Observes both sides of the roadway.

  (a) Roadside activity--pedestrians, cycles, parked cars.

  (b) Signs.

(3) Avoids diverting attention for more than a second.

  (a) Avoids prolonged looks at mirrors, instruments, fuel controls.

  (b) Common cause of motorcycle accidents.

2.3 Enhancing Ability to See

Using pictorial visuals, the instructor should illustrate and discuss the effect of the following upon visibility.

(1) Vehicle ahead.

    (a) Operate in left portion of lane.

    (b) Look over the top of cars.

    (c) Allow greater following distance behind large vehicles.

(2) Curves.

    (a) Enter left curve in right hand portion of lane.

    (b) Enter right curve in left hand portion of lane.

(3) Night.

    (a) Use high beams whenever possible.

    (b) Take advantage of the headlights of the car ahead.

    (c) Use taillights of car ahead for warning of bumpy surfaces.

(4) Speed.

    (a) Keep speed within four-second sight distance.

    (b) Reduce speed for limited visibility.

- Hills, curves.
- Fog, rain.

3. Seeing to the Side

3.1 Need to Look to the Side

(1) Necessary wherever traffic could cross or enter path.

    (a) Intersections, railroad crossings.

    (b) Areas of roadside activity (e.g., shopping centers).

    (c) 25% of motorcycle accidents involve intersecting vehicles.

(2) Check to the side even where cross traffic is controlled.

    (a) Motorcycle is undetectable; cannot be sure it is seen.

    (b) Vulnerability justifies added precaution.

3.2 Enhance Ability to See to the Side

Using pictorial visuals, the instructor should illustrate and discuss effectiveness of the following upon the ability to see vehicles from either side.

(1) Position

(a) Change lane or lane position to optimize view to the side.

(b) Edge close to blind intersection.

- Short length of motorcycle allows operator to "peek" around corners.
- Can lean forward if necessary.

(2) Speed

(a) Adjust speed to ability to see cross traffic.

(b) Stop if it is necessary to look around corners.

(c) Where view is blocked by stalled traffic, wait for it to clear.

- Cross traffic.
- Oncoming traffic (when making a left turn).

4. Seeing Behind

4.1 Need to See Behind

(1) Motorcycle is hard to detect from the rear.

(a) Narrow silhouette.

(b) Low illumination (taillight vs. headlight).

(2) Rearend accidents are frequent (about 15% of motorcycle accidents).

4.2 When to Look Behind

(1) Periodic mirror checks.

(a) Check every few seconds.

(b) Frequent checks are needed to detect overtaking vehicles.

(2) Changing Lanes--Observe adjacent lanes for traffic.

(3) Stopping

  (a) Following drivers may not notice the motorcycle.

  (b) Particularly important where speed reduction is unexpected.

    - Slowing to pull off high-speed highways.
    - Slowing in mid-block to park.

(4) While Stopped.

  (a) Motorcycle may not be noticeable against the background of the car ahead.

  (b) Should monitor the rearview mirror while stopped.

4.3 Mirror Adjustment

The instructor will describe and illustrate the procedure for adjusting mirrors.

(1) Mirrors should be adjusted to provide maximum rearward view.

(2) Adjust mirrors so that each mirror shows the middle of the lane directly behind.

  (a) There should be a minimum of overlap between the two mirrors in order to provide maximum view of rear quarters.

  (b) Need a fixed reference point directly behind the motorcycle to permit adjustment.

  (c) Adjustment should be performed while seated in the normal operating position.

(3) Arms should be barely visible.

  (a) Mirrors should be swung outward far enough to prevent arms from interfering with view.

  (b) This requirement is secondary to (1) above.

    - Some adjustment procedures call for using the arms as reference points. Such a procedure doesn't assure maximum view of adjacent lanes and road behind.

4.4 Distance Judgment

The instructor will illustrate and discuss the perception of distance in a convex mirror.

(1) Distortion Problem.

  (a) Provides wider view of the roadway behind.

  (b) Makes cars seem farther away.

  (c) Makes overtaking cars difficult to detect.

  - Cars seem to come out of "nowhere."
  - Requires frequent mirror checks.

(2) Classroom Exercise.

The following exercises should be carried out using static pictorial visuals.

  (a) Have students compare the images of a given vehicle from convex and flat mirrors.

  (b) Exhibit convex mirror image and have students select, from alternatives, the flat mirror image corresponding to it.

4.5 Enhancing Rearward Visibility

Using pictorial visuals, instructor will discuss and illustrate the following methods of enhancing rearward visibility.

(1) "Head" checks (i.e., over-the-shoulder checks).

  (a) Discussion and illustration of the blindspot.

  (b) Value of headchecks in observing vehicles in the blindspot.

(2) Motorcycle angle.

  (a) When leaving curve, motorcycle should be angled at approximately 45° to traffic stream.

  - When entering traffic.
  - When beginning a U-turn.

  (b) Angle position allows traffic to be viewed without using mirrors or looking over the shoulder.

5. Traffic Situations

Using pictorial visuals, the instructor will illustrate a variety of traffic situations and call upon students to describe appropriate responses. Situations may include the following:

(1) Following another vehicle.

  (a) Normal size vehicle.

  (b) Oversized vehicle.

(2) Approaching an intersection where view of cross traffic is:

  (a) Not obscured.

  (b) Obscured by buildings or parked vehicles.

  (c) Obstructed by stalled cross traffic or oncoming traffic.

(3) Entering left and right curves.

(4) Slowing to pull off the roadway.

(5) Changing lanes.

(6) Entering traffic from the roadside.

MOTORCYCLE SAFETY EDUCATION PROGRAM

UNIT	LESSON	SESSION	TITLE	MODE
II	1	2	Being Seen	Classroom

PURPOSE

The purpose of this Session is to develop the knowledge of procedures that will assure the motorcycle is seen by other road users.

CONTENT

This Session consists of the following topics:

1. Lights
2. Clothing
3. Position
4. Horn
5. Turn Signals

This session will rely heavily upon the use of visuals to illustrate the effect that various methods have upon making the motorcycle more visible to other road users. In addition to content concerned with communicating the presence of the motorcycle, this Session includes some information concerned with communicating the operator's intent, i.e., signalling; however, this content is minimal owing to the similarity of signalling procedures with those involved in the operation of an automobile. The title of the Session reflects the greater volume of information concerned with making sure the motorcycle is seen.

MATERIALS

Student Materials

See Unit Specifications.

Teacher Materials

See Unit Specifications.

Instructional Aids

Instructional Aids required in support of Session instruction include static or dynamic aids capable of depicting the following:

(1) The effect upon motorcycle detectability of the following:

  (a) Daytime use of headlight and taillight.

  (b) Operation of brake light while stopped.

  (c) Highly visible clothing.

(2) The effect of motorcycle positions upon the detectability of the motorcycle to:

  (a) Drivers approaching at intersections.

  (b) Drivers operating ahead of the motorcycle.

  (c) Drivers in adjacent lanes.

(3) The effect of parking angle upon the detectability of the motorcycle to:

  (a) Drivers approaching the parking space.

  (b) Drivers parked in front of the motorcycle.

(4) The effect of turn signals upon the detectability of the motorcycle to following drivers.

METHODS

1. Lights

1.1 Headlights

(1) Demonstration--Using static visuals, the instructor will illustrate the effect that daytime use of the headlight has on the detectability of the motorcycle.

(2) Evidence--The instructor should describe briefly evidence in favor of daytime use of headlights:

  (a) In the majority of motorcycle collisions, the other driver did not see the motorcycle.

  (b) Studies show that headlights make the motorcycle more detectable in the daytime.

(3) Controls--The instructor will describe and illustrate location of headlight controls.

(a) On/off

- Ignition switch.
- Lack of separate control (goes on with ignition).

(b) Dimmer switch

- Common location (left handlebar)
- Common switch positions
- High beam indicators (on dash)

1.2 Taillights

(1) Effect--Using static visuals, the instructor will show the effect that the tail light has on the detectability of the motorcycle to following drivers.

(2) Control

(a) Generally goes on with headlight.

(b) Some motorcycles have separate control.

1.3 Brake Light

(1) While stopped

(a) Maintaining brake pressure while stopped causes brake light to remain on.

(b) Increases intensity of taillight.

(c) Helps the motorcycle to be observed against background of vehicles ahead.

(2) When slowing

(a) Purpose--The instructor should describe flashing the brake light as a warning to following vehicles.

- Catches the driver's attention.
- Constitutes a "warning."
- Helps to contrast brake light with taillight.

(b) Situations--Best used when the motorcycle is slowing or stopping where the following driver would not expect it to.

- Pulling off a high speed highway.
- Preparing to park in the middle of a block.
- Slowing for dangerous surface conditions or obstacles ahead.

2. Clothing

The instructor should describe and illustrate the way the operator's attire may be used to increase detectability to other road users.

2.1 Items of Clothing

(1) Helmet

(2) Jacket

(3) Vest

(a) May be used at all times.

(b) Should at least be kept on the motorcycle for use at nighttime and in bad weather.

2.2 Method

(1) Colors--In decreasing order of detectability:

(a) Fluorescent yellow, orange, red

(b) White

(c) Yellow

(d) Orange

(e) Red

(2) Reflective material

(a) Helmet and clothing made of reflective material.

(b) Reflective tape affixed to clothing and/or motorcycle.

2.3 Value

(1) Imperative where headlights not used in the daytime.

(2) Even where headlight is used:

  (a) Improves detectability in other than the head-on position.

  (b) Particularly important at night--more detectable to following drivers than the taillight.

3. Position

The instructor will discuss and illustrate the way in which the motorcycle may be positioned to enhance its detectability to other road users.

3.1 Intersections

(1) Approaching cross traffic

  (a) Position motorcycle as close to the center of the road as possible.

  (b) Center position allows the motorcycle to be seen--compatible with observational procedure (if operator can't see car, driver can't see motorcycle).

  (c) Places motorcycle in driver's line of sight.

(2) Oncoming vehicles turning left

  (a) Position motorcycle toward the right side of the road.

  (b) Closer to driver's line of sight (driver will be looking to his left in preparation for the turn).

(3) Crossing alongside a larger vehicle (i.e., running interference).

  (a) Larger vehicle is more detectable.

  (b) Should not turn a corner alongside another vehicle--vehicle may change lanes and crowd the motorcycle.

3.2 Following Another Vehicle

The instructor will discuss and illustrate the advantage of a center lane position when following another vehicle.

(1) Allows the driver to see motorcycle better.

(2) Knowing the motorcycle is behind lessens the chance of an unexpected maneuver (e.g., changing lanes as the motorcycle pulls out to pass).

(3) Guide--motorcycle operator shouldn't be so far to one side of the lane that he can't see rearview mirror of the car ahead.

3.3 Vehicles in Other Lanes

The instructor should discuss and illustrate the hazard of driving in another driver's blind spot.

(1) Driver may change lanes without signalling.

(2) If operating alongside, speed up or drop back.

(3) If passing, move through blind spot as quickly as possible.

3.4 Oncoming Vehicles

The instructor will discuss and illustrate the advantage of a center lane position in making the motorcycle visible to oncoming drivers in a stream of traffic.

3.5 Parking

(1) Parallel parking--angle motorcycle away from curb (if State law permits).

(a) More observable to car ahead of motorcycle.

- Driver can see motorcycle in the rear view mirror.
- Less likely to back into motorcycle when pulling out.

(b) More observable to cars approaching the parking space.

- Driver will know the space is occupied.
- Less likely to start pulling into the space.

(2) Angle or perpendicular parking--position the motorcycle near the street end of the parking stall. (Laws permitting).

(a) Approaching driver will see the spot is occupied.

(b) Driver less likely to start pulling into spot.

4. Horn

The instructor will discuss the value of the horn as a warning device.

(1) Not loud but better than nothing.

(2) Operator should be prepared to use it when approaching a potential hazard.

  (a) Parked car with someone in it.

  (b) Someone walking or riding near the roadside.

(3) "Cover" the horn switch by placing thumb on horn button.

  (a) Horn button may be difficult to locate in a hurry.

  (b) Particularly difficult to locate when hand is gloved.

  (c) Particularly necessary when operating a strange motorcycle (horn locations differ).

5. Turn Signals

The instructor should illustrate and discuss the use of turn signals as a means of improving detectability.

(1) When to signal

  (a) Turns, lane changes, entering and leaving streets and highways/

  (b) In addition to communicating intent, makes the motorcycle more readily observed. Particularly important when:

- Turn requires slowing (same situation as requires flashing brake signal).
- Merging - brake light cannot be seen well at an angle.

(2) Should not be used when changing position within lane--confuses other drivers.

(3) Cancelling signals.

  (a) Incorrect signal may encourage another driver to pull into the path of the motorcycle.

  (b) Aids to operator:

- Frequent glances at instrument cluster.
- Installation of a "beeper."
- Specific time to cancel (to establish the habit).

(4) Hand signals.

(a) Signals are the same as an automobile--should not need to be reviewed.

(b) Less effective than electric signals.

- Less likely to be seen.
- Does not enhance the detectability of the motorcycle itself.
- Requires removing left hand from handgrip.

(c) When necessary to use hand signals:

- Return hands to handgrip before beginning any turn.
- Use right hand when changing lanes to right.
- More readily seen by cars in the right lane.
- Can be used only where throttle control is not necessary.

6. Range Preparation

The instructor should provide a brief overview of the range session that follows the class session.

6.1 The instructor should briefly describe the activities that will take place in Session 3.

Session 3
(1) Adjusting mirrors
(2) Operating communicating devices
(3) Seeing ahead
(4) Seeing behind

6.2 Range Communications

The following additional signals will be demonstrated:

(1) Activate signal
(2) Cancel signal
(3) Perform headcheck
(4) Use your mirrors
(5) Keep your head/eyes up
(6) Move left
(7) Move right
(8) Move center

The following signals used previously may be employed as follows:

Ride closer together -
- lagging behind
- too large a gap between

Ride farther apart-
- too little following distance
- too small a gap accepted

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MOTORCYCLE SAFETY EDUCATION PROGRAM

UNIT	LESSON	SESSION	TITLE	MODE
II	1	3	Seeing and Being Seen: Application	Range

PURPOSE

The purpose of this Session is to provide students the practice they need to develop the ability to apply procedures for seeing and being seen, while maintaining control of the motorcycle speed and direction.

CONTENT

This Session consists of the following topics:

1. Adjusting Mirrors
2. Operating Communication Devices
3. Seeing Ahead
4. Seeing Behind

MATERIALS

See Course Specifications.

EQUIPMENT

See Course Specifications.

FACILITIES

See Course Specifications

METHODS

1. Adjusting Mirrors 5 minutes

(1) Purpose--The purpose of this exercise is to enable students to adjust their mirrors in a way that will provide a maximum view with a minimum of head movement.

(2) Range Layout--A series of markers, one pair for each motorcycle, should be placed at 15 foot intervals along the Range. Approximately 50 feet should separate each marker in the pair. Refer to illustrative diagram "Adjusting Mirrors."

(3) Exercise Procedure--At the beginning of the Range Session, students should be provided an opportunity to adjust their mirrors using a reference point behind the motorcycle. The following exercise provides this opportunity as well as affording the instructor a means of assessing the adequacy of adjustment.

(a) One motorcycle should be positioned at each marker, with the rear of the motorcycle pointing at the other marker of the pair.

(b) Students should be instructed to:

- Mount the motorcycles and assume a normal seated position.
- Adjust their mirrors properly, using the other marker as a guide.
- Look in their mirrors and to raise their hand when the instructor is observed. They should raise the hand corresponding to the mirror in which the instructor is observed, using both hands when he is observed in both mirrors.

(c) The instructor should check the mirror adjustment by assuming a position behind each operator. Both hands should be raised when the instructor is standing next to the marker. Only one hand should be raised as the instructor approaches and leaves the marker.

(d) The instructor should come to a stop behind each motorcycle and not simply walk down the line of markers. At each point, he should position himself in a way that will allow him to verify that the mirror is correctly adjusted. Some students will raise their hands after the instructor passes the preceding student, whether they see him or not.

(4) Operating Procedures--Mirrors should be adjusted so that the marker is just visible at the inside edge of both mirrors. This procedure provides maximum rearward visibility by assuring that (1) the area directly behind the motorcycle is observable, and (2) the overlap between the mirrors is minimal, thereby allowing a maximum view of the two rear quarters. This procedure is more exact than one that uses the operator's body as a reference point.

(5) Instruction Points--The instructor should observe students for the following:

(a) Leaning or slumping in order to observe the instructor.

(b) Failure to detect the instructor's presence.

(6) Method--Where mirrors need adjusting, the student should perform the readjustment using the marker as a guide, while the instructor moves on to other students. The instructor will return to students who readjusted their mirrors before continuing to the next exercise.

2. Operating Communication Devices 15 minutes

(1) Purpose--The purpose of this exercise is to enable students to operate communication devices without looking at the device and without deviating from their intended path of travel.

(2) Range Layout--The range should be configured to provide:

(a) Lanes of at least 9 feet in width.

(b) Two-way traffic.

(c) A generally rectangular path permitting left and right turns of approximately 90°.

(d) At least one of each of the following:

- Cross street.
- "T" intersection.
- Merge.

Refer to the illustrative range layout in the Course specifications.

(3) Exercise Procedures--Students will ride their motorcycles around the range using the following procedure:

(a) One student leads; others follow.

(b) A speed of 10-15 mph will be maintained.

(c) A following distance of approximately 40 feet will be maintained.

(d) The leader will make such turns as necessary to avoid crossing the path of following students.

(e) All turns will be signalled using electric turn indicators.

(f) Headlights will be turned on high beam and will be:

- Dimmed in response to oncoming vehicles.
- Returned to high beam after passing.

(g) The lead student will sound his horn in response to a signal from the instructor (horn blast, head light flick, etc.).

- The horn signal will be automatically passed along, reaching students some distance from the instructor.

- The signal should be given without notice so that students will have to locate horn button quickly.

(h) At periodic intervals, the lead student will be signalled to pull out and drop to the end of the procession, allowing a new student to assume the lead position.

(i) Students will come to a complete stop, as if a stop sign were present, in the following situations:

- On a street terminating in a "T" intersection.
- On approaching an intersection where following traffic is still crossing.

(4) Operating Procedures--Students will perform the exercise using the following procedures:

(a) Signal devices will be operated without taking the eyes off the path ahead.

(b) Turn signals will be operated as follows:

- All turns will be signalled, even when the need for a turn is obvious.
- The turn signal will be activated at least three seconds before the turn is begun.
- Signals will be cancelled immediately after completing the turn.

(c) Brake pressure will be applied to keep the brake light on during all stops.

(5) Instruction Points--The instructor will observe students for the following errors:

   (a) Failure to signal a turn.

   (b) Late activation of turn signal.

   (c) Failure to cancel turn signal.

   (d) Taking eyes off of the path ahead to look at signal device.

   (e) Allowing motorcycle to deviate more than three feet from the normal path while operating signal devices.

   (f) Failure to dim the headlight or return to high beam.

   (g) Failure to keep brake applied while stopped.

(6) Method--The instructor will assume the lead position to start and demonstrate the exercise. While in the lead position, the instructor will use all communication devices properly. After a few minutes, the instructor will signal the student behind to "pass" and will "pull off the road" in order to (a) observe students, (b) give the horn signal, and (c) signal a change in the leader position.

A critique should be given after the exercise is complete.

3. Seeing Ahead 10 minutes

(1) Purpose--The purpose of this exercise is to allow students to develop the ability to maintain control of the motorcycle's speed and position while scanning ahead of the motorcycle.

(2) Range Layout--The Range configuration should provide a perimeter path and one path down the center. Students would enter the center path and ride to the far end of the range. The perimeter path would be used to return to the original entry point. Refer to the illustrative layout "Seeing Ahead."

(3) Exercise Procedures--Students should be forced to keep their vision directed well ahead of the motorcycle, something that they have not been required to do up to this point. The following exercise accomplishes this by requiring the operator to focus on the motorcycle ahead to obtain a directional signal. The procedure is as follows:

(a) Students line up in pairs at the entry to the center path.

(b) The instructor, located at the entry point, signals the first operator in the first pair to start down the center path. The second operator is signalled to start approximately 2-3 seconds later.

(c) The first rider in the pair uses the turn indicator to signal the following operator which way to turn at the end of the path. Several signals in each direction may be given. Each signal should last only one or two flashes.

(d) Upon reaching the end of the task, the first student turns either direction at will. The second student must turn in the direction last signalled by the first student.

(e) Upon returning to the entry point, the two students in each pair switch positions.

(f) Pairs of students should be separated from one another at approximately four-second intervals.

(4) Operating Procedures--Not applicable.

(5) Instruction Points--The instructor observes the second rider in the pair for the following:

(a) Failure to maintain a straight path.

(b) Lack of distance scanning, as evidenced by a turn in the wrong direction (this information can be obtained from the lead student, if the instructor misses the signal).

(6) Method--The exercise should begin with a demonstration by the instructor and assistant instructor (or an advanced student) of the manner in which the exercise is performed. Feedback may be provided to individual students while they are awaiting their next turn at the entry point.

4. Seeing Behind

4.1 Observing a Following Motorcycle 10 minutes

(1) Purpose--The purpose of this exercise is to help students develop the ability to maintain control over the motorcycle's

speed and position while shifting attention between the path ahead and a vehicle behind (as seen through the mirrors).

(2) Range Layout--Same as Exercise 3.

(3) Exercise Procedure--Students should be forced to shift attention back and forth between the path ahead and each mirror. This may be accomplished through an exercise similar to Exercise 3. The differences in exercise procedures would be as follows:

(a) The second student would give the turn signal.

(b) The first student would turn in the direction last signalled by the second student. It does not matter which direction the second student turns.

(c) Each signal should consist of two flashes so that it has a reasonable chance of being detected.

(4) Operating Procedures--Not applicable.

(5) Instruction Points--Same as Exercise 3.

(6) Method--The procedure need only be explained to students. Because of the similarity of this exercise to the previous one, no demonstration should be necessary.

4.2 Seeing Behind: Distance Judgment 10 minutes

(1) Purpose--The purpose of this Exercise is to help students develop skill in judging the position of a following vehicle observed through a convex mirror.

(2) Range Layout--Same as Exercise 3.

(3) Exercise Procedure--Students should be required to make a judgment concerning the distance of a following vehicle. The following procedure may be used:

(a) The same student pairs follow the same path used in the previous two exercises. A speed of 10-15 mph should be maintained.[1/]

[1/] Students could equally well operate continuously around the perimeter of the Range area. The above pattern was selected because (a) it maintains the same pattern as preceding and following exercises, and (b) it allows use of the entry point for giving instruction and switching positions within pairs.

(b) The first student in the pair will maintain a center lane position at all times.

(c) The second student will shift in a more or less random fashion among the following positions:

- A two-second following distance in the center lane position.
- A two-second following distance in the left or right portion of the lane.
- A one to two-second following distance in the left or right portion of the lane.

(d) The first student should give a hand signal any time the second student closes to less than two seconds following distance. When the signal is given, the second student drops back and adopts a new position.

(e) To increase capacity, the pairs may alternate on right and left lanes of the center path. Upon reaching the end of the path, those in the right lane would turn right, those in the left lane would turn left.

(f) Upon returning to the entry point, students would switch position in pairs.

The second student should never close to less than two seconds while immediately behind the first student (because of the potential hazard involved). To prevent the first student from associating lane position with closure, a move to a right or left lane position should not always be followed by reduced following distance.

(4) Operating Procedures--Not applicable.

(5) Instruction Points--The lead student in each pair should be observed for the following:

(a) Being tailgated without giving a hand signal.

(b) Giving a hand signal without being tailgated.

(c) Failure to maintain directional control while using mirrors.

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(6) Method--The exercise procedure should be explained and then demonstrated by the instructor and assistant instructor (or advanced student). The demonstration should include all following positions and the use of a hand signal.

Students may be apprised of their judgment errors upon their return to the reentry point. The second student in each pair may be asked to determine the nature and extent of errors made by the first student.

4.3 Seeing Behind: Lane Change 10 minutes

(1) Purpose--The purpose of this exercise is to help students gain the ability to make visual checks appropriate to a lane change while maintaining control of the motorcycle's speed and position.

(2) Range Layout--Same as Exercise 3.

(3) Exercise Procedure--Students should be required to perform the visual checks needed to determine whether a lane change may be safely made. The following exercise may be used for this purpose:

(a) Students operate in the same pairs and at the same speed as described in Exercise 4.2.

(b) The first student enters either lane of the center path. Initially, the lane may be assigned by the instructor; on subsequent circuits, students will enter the lane closest to the return path that is used. This will result in an alternating pattern.

(c) The second student will follow the first student and may assume any one of the following positions:

- Immediately behind the first student at a two-second following distance.
- In the adjacent lane at a two-second following distance.
- In the adjacent lane at less than a two-second following distance, including almost alongside the first student.

(d) The first student, upon reaching the midpoint of the center path (i.e., the intersection in the illustrative Range layout) will signal a lane change:

- If a lane change may be safely made, the student changes lanes.
- If a lane change cannot be safely made, the student cancels the signal and remains in lane.

(e) On reaching the end of the center path, the first student will turn in the direction appropriate to the lane occupied.

(f) If the first student attempts an unsafe lane change, the second student will sound the horn and the first student will return to the original lane.

(g) The second student will always turn in the direction taken by the first student.

(h) Students will switch positions within pairs after each circuit.

(4) Operating Procedures--In making a lane change, the lead student will perform the following steps:

(a) Activate turn signal.

(b) Check rearview mirror for vehicles in the lane to be entered.

(c) Make an over-the-shoulder check for a vehicle in the motorcycle's blindspot.

(d) Turn smoothly, not abruptly into the adjacent lane.

(5) Instruction Points--The instructor will observe the lead student for the following errors:

(a) Failure to activate the turn signal.

(b) Failure to make an over-the-shoulder check.

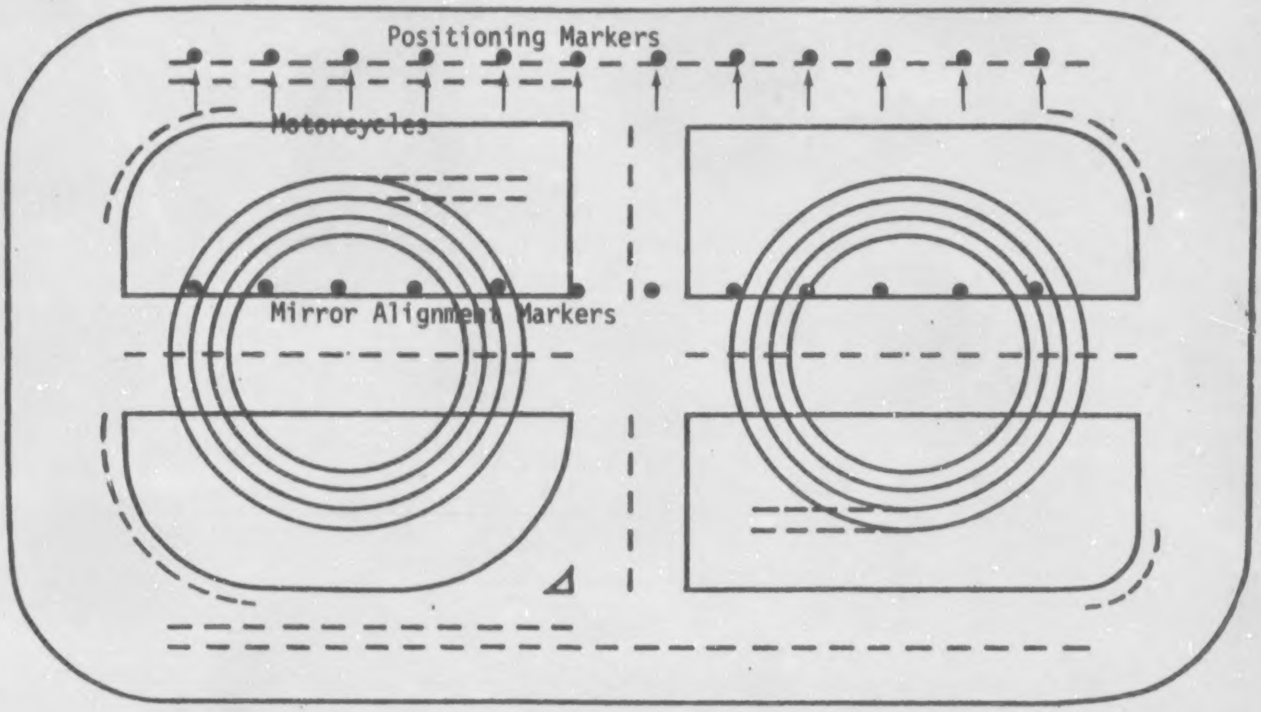
(c) Attempting an unsafe lane change--horn sounded.

(d) Fail to attempt a safe lane change (as reported by the second student).

(e) Moving laterally as a result of the over-the-shoulder check.

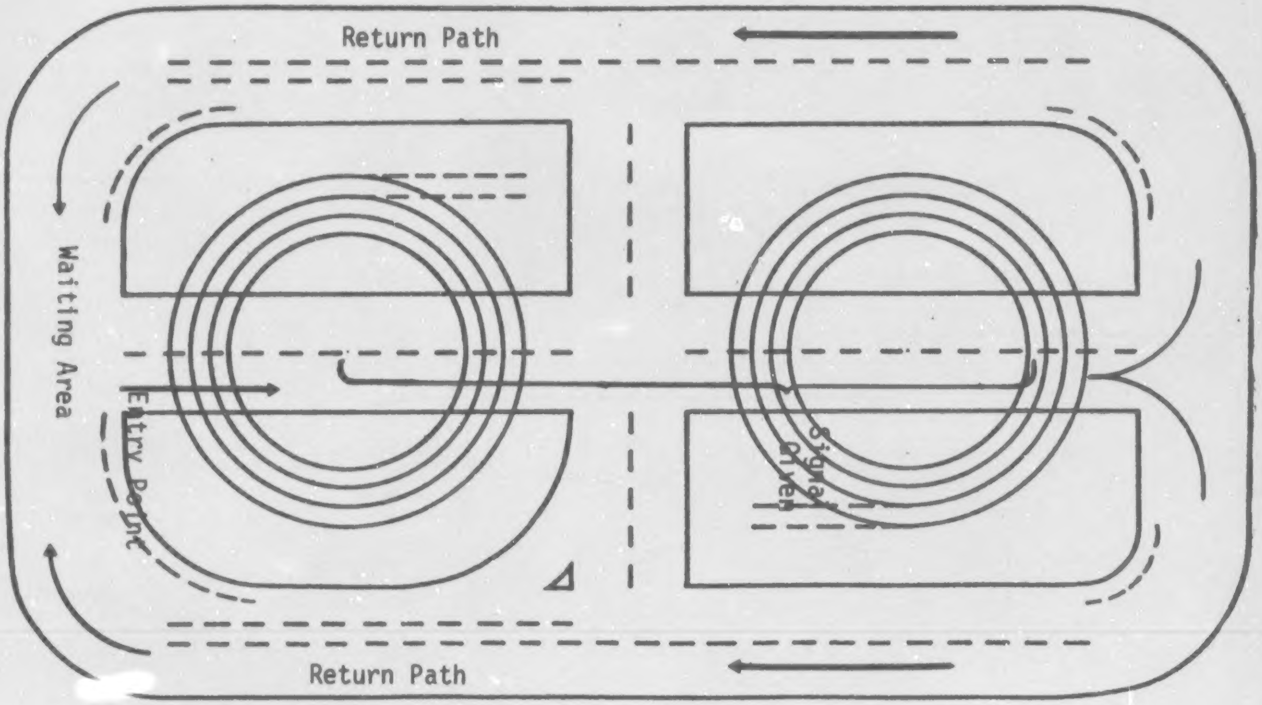
(6) Method--The exercise procedure should be explained and demonstrated by the instructor and assistant instructor (or advanced student). The lead student should be apprised of deficiencies upon returning to the entry point after completing a circuit.

EXERCISE 1 - ADJUSTING MIRRORS


Positioning Markers
Motorcycles
Mirror Alignment Markers

EXERCISE 3 - SEEING AHEAD

EXERCISE 4.1 - SEEING BEHIND: FOLLOWING VEHICLE


Return Path
Waiting Area
Entry Point
Signal Given
Return Path

MOTORCYCLE SAFETY EDUCATION PROGRAM

UNIT	LESSON	TITLE
II	2	Responding to Traffic Characteristics

PURPOSE

The purpose of this Lesson is to enable students to adjust speed and position to maintain a safe operating distance from other road users.

OBJECTIVES

Performance Objectives	Knowledge and Skill Objectives
VEHICLES AHEAD	
Oncoming Vehicles--The student must alter lane or lane position upon approaching oncoming vehicles.	The student must know the potential hazard represented by oncoming vehicles.
Lead Vehicle--The student must remain a sufficient distance from the vehicle ahead to be able to respond to changes in speed or direction of vehicles ahead, to the appearance of obstacles from beneath the vehicle ahead, or to an overtaking vehicle.	The student must know how to compute following distance by means of time intervals. The student must be able to judge following distance at all speeds.
Traffic Hazards--The student must be prepared to adjust speed and position to maximize maneuverability and available response time when encountering potential traffic hazards.	The student must know the signs of potential hazard including indications of (1) confusion, (2) distractions, (3) loss of control, and (4) driver incapacity.
Timing--The student must initiate changes in speed or position in sufficient time to avoid conflict with other vehicles.	The student must know roadway configurations and traffic patterns that frequently necessitate speed and position changes.
Visibility Limitations--The student must allow adequate response time by increasing inter-vehicle distances and reducing speed under conditions which limit visibility, including darkness, rain, fog, glare, oversized vehicles ahead, and roadside structures.	The student must know the effects of visibility limitations upon the ability to identify and respond to changes in roadway or traffic conditions.

Performance Objectives	Knowledge and Skill Objectives
VEHICLES TO THE SIDE	
Adjacent Vehicles--The student must adjust position within lane to maximize separation from adjacent vehicles, including vehicles passing from behind or from the opposite direction, parked vehicles, pedestrians, bicyclists, or animals.	The student must know the potential hazards arising from wind turbulence and sudden lateral movement of other road users. The student must know the effect of lane position and signals upon lane sharing by other road users. The student must know the hazards of lane sharing by motorcyclists.
Converging Vehicles--The student must maximize lateral separation within lanes or by means of a lane change, when approaching merging or intersecting vehicles.	The student must know the potential hazards arising from failure of converging vehicles to yield the right of way.
VEHICLES BEHIND	
Following Vehicles--The student must respond to a closely following vehicle by increasing following distance and encouraging the following vehicle to pass.	The student must know the maneuvers and hand signals that encourage following vehicles to drop back or pass.
Overtaking Vehicles--The student must avoid lane changes in the presence of overtaking vehicles in adjacent lanes.	The student must be able to judge distances and rate of closure of overtaking vehicles when viewed through flat and convex mirrors.
GAPS	
Entering Gaps--The student must be able to safely cross the path of traffic approaching from the side, turn in front of oncoming traffic, enter an adjacent lane, or pass another vehicle.	The student must know the time and distance required to cross or enter a lane of traffic or to pass another vehicle. The student must be able to judge whether a gap is acceptable, based upon gap size, closing rates, and the accelerative capability of the motorcycle.

CONTENT

The above objectives are met through:

(1) Responding to Traffic Characteristics: Principles (Classroom)

(2) Responding to Traffic Characteristics: Application (Range)

MOTORCYCLE SAFETY EDUCATION PROGRAM

UNIT	LESSON	SESSION	TITLE	MODE
II	2	1	Responding to Traffic Characteristics: Principles	Classroom

PURPOSE

The purpose of this Session is to communicate principles for adjusting speed and position to maintain a safe distance from other vehicles.

CONTENT

This Session consists of the following topics:

1. Oncoming Vehicles
2. Vehicles Ahead
3. Intersecting Vehicles
4. Adjacent Vehicles
5. Merging Vehicles
6. Following Vehicles
7. Parked Vehicles

The content of this Session focuses almost entirely upon maintaining separation between the motorcycle and other vehicles. This emphasis is a function of (1) the motorcycle's extreme vulnerability and the unusual need for time to respond to unanticipated actions of other road users, (2) the motorcycle's relative lack of detectability and the increased likelihood that drivers will maneuver in a way that is hazardous to motorcycle operators, and (3) the motorcycle's unique ability to adjust position within lane as a means of controlling separation.

Several aspects of response to traffic conditions do not appear because the knowledges are identical to those involved in operation of an automobile. These include (a) general speed considerations, (b) gap judgment, (c) passing procedures, (d) responding to pedestrians, and (e) reacting to emergency vehicles and school buses.

After the principles of distance separation are introduced, students will apply these principles to a variety of situations depicted through the use of visual aids. None of these situations will require trade-offs between principles of separation and those of Seeing (II-1-1), or Being Seen (II-1-2).

MATERIALS

Student Materials

See Unit Specifications.

Teacher Materials

See Unit Specifications.

Instructional Aids

A set of static visuals is needed to illustrate proper distance separation relative to each of the types of vehicles identified in "Content" above. In addition, it is desirable to have a set of dynamic visual aids illustrating the hazards imposed by the unexpected maneuvers of other road users. Scenes should always depict the motorcyclist as exhibiting correct behavior and, therefore, avoiding any need for sudden evasive maneuvers. Scenes that show the motorcyclist in jeopardy may heighten the anxiety which often accompanies entry into the street operation. This does not preclude the use of diagrams to trace out the consequences of inappropriate behavior on the part of the rider.

METHODS

1. Oncoming Vehicles

1.1 Hazard

Instructor will describe the potential hazards created by oncoming vehicles:

(1) Making a left turn across the motorcycle's path.

  (a) Driver who is looking left may not see the motorcycle.
  (b) This type of accident accounts for two-thirds of intersection accidents.
  (c) It is particularly likely to occur where the driver is not forced to slow or stop for cross traffic, e.g., shopping center entrances, driveways, side roads.

(2) Pulling out to pass. Most likely when:

  (a) A car is rapidly overtaking another car ahead.
  (b) There is a stream of slow moving traffic.

(3) Drifting across the center line.

  (a) In curves.
  (b) When entering from the roadside or a side road.
  (c) When driver is distracted, sleepy, or intoxicated.

(4) Responding to hazards.

  (a) Forced across the center line by a car or pedestrian.
  (b) Being merged with.

(3) Air turbulence.

1.2 Approaching Oncoming Vehicles

(1) Adopt the center lane position.

(2) This position reduces potential hazards without encouraging lane sharing.

1.3 Approaching Potential Hazards

(1) Instructor will describe and illustrate potentially hazardous oncoming vehicles.

  (a) Vehicles stopped.
  (b) Vehicles signalling left.
  (c) Vehicles rapidly overtaking another car or obstruction.
  (d) Vehicle approaching a lane restriction.

(2) Increasing separation.

  (a) Reduce speed to increase maneuverability.
  (b) Move as far to the right as possible.
    - Lane change
    - Right portion of lane
  (c) Limit duration of lateral movement.
    - Initiate as hazard is approached.
    - Return after hazard is passed.
    - Prolonged position change may invite lane sharing.
  (d) Prepare to brake.
  (e) If not closely followed, stop and allow the oncoming vehicle to complete the maneuver (e.g., left turn).

2. Vehicles Ahead

2.1 Need for Distance Separation

The instructor will illustrate and describe the need to maintain a space separation in order to react to:

(1) Sudden stops.

(2) Obstructions appearing from beneath the vehicle.

2.2 Normal Following Distance

Using visual aids, preferably dynamic, the instructor will illustrate the two-second following rule.

2.3 Increased Distance

The instructor will discuss some of the conditions requiring an increased following distance.

(1) Slippery surface--It will take longer to stop or turn in avoiding a hazard.

(2) Driver vision restrictions--Any condition that restricts the lead driver's visibility may lead to a sudden stop.

- (a) Following another car too closely.
- (b) Sharp curves, hill crests.
- (c) Blind intersections.

(3) Motorcycle operator restrictions--Circumstances that prevent the operator from seeing conditions ahead of the lead vehicle.

- (a) Oversized vehicles.
- (b) Darkness.

(4) Vehicles that constitute potential hazards, including:

- (a) Large trucks and buses capable of propelling debris rearward.
- (b) Vehicles operating erratically.
- (c) Drivers who appear to be confused (tourists, slow drivers).
- (d) Vehicles carrying loose or protruding loads.

(5) When followed by a tailgater--An increased following distance:

- (a) Allows the motorcycle to slow more gradually if the vehicle ahead stops.
- (b) May encourage the tailgater to pass.

2.4 Separation When Stopped

The instructor will note the need to stop well behind the vehicle ahead so as to be able to maneuver out of the way if endangered by an overtaking vehicle.

3. Intersecting Vehicles

3.1 Hazard

(1) Accounts for about one-third of intersection collisions.

(2) Drivers are often looking along their prospective path.

3.2 Maximize Separation

The instructor will illustrate and discuss the following:

(1) Move toward the center of the roadway.

  (a) Left lane position.
  (b) Left lane where possible.

(2) Procedure is compatible with procedures for Seeing and Being Seen.

4. Adjacent Vehicles

Discuss distance separation from vehicles that are travelling or passing in adjacent lanes.

4.1 Potential Hazards

Discuss the possible hazards imposed by vehicles in adjacent lanes.

(1) Quick lane changes.

  (a) The motorcycle is hard to detect through peripheral vision.
  (b) Most likely to occur when:
    - Approaching merge points.
    - Operating in traffic circles and other places where lanes are not clearly indicated.
    - Where the vehicle is completing a pass.

(2) Maneuver restriction imposed if an emergency occurs.

(3) Turbulence, particularly from large vehicles.

(4) Vehicle extensions, e.g., extended mirrors.

(5) Articles thrown from adjacent vehicles.

4.2 Distance Separation

(1) Adjust speed to pull ahead of or drop behind an adjacent vehicle.

(2) Maintain a center lane position.

(3) Avoid moving to far portion of the lane (encourages lane sharing).

4.3 Operating Between Lanes of Adjacent Traffic

(1) Hazard--The instructor will describe the hazards of attempting to operate between lanes of stopped or slow moving traffic.

- (a) Door opening.
- (b) Sudden attempt to change lanes.
- (c) Extended mirrors.
- (d) Items thrown from vehicles.
- (e) Driver anger resulting in attempts to injure the rider.

(2) The instructor will point out the inconsistency between the motorcyclist's lane sharing and attempts to discourage lane sharing by drivers.

5. Merging Vehicles

5.1 Hazard

(1) Driver directly alongside may not pick up motorcycle in peripheral vision.

(2) Driver entering highway ahead may not see motorcycle overtaking in main roadway.

- (a) Motorcycle may be in other driver's blindspot.
- (b) The headlight is not particularly noticeable from driver's angle.

5.2 Position

(1) If possible, change lanes.

- (a) A lane change is more noticeable than speed reduction.
- (b) Avoids conflict with following vehicles.

(2) If a lane change is not possible:

   (a) Slow down and allow the car to enter ahead.
   (b) Do not attempt to accelerate ahead of the converging car.

6. Following Vehicles

6.1 Hazard

Rear-enders account for:

(1) About 15% of all accidents.

(2) About one-third of all non-intersection accidents.

6.2 Maintaining Normal Separation

(1) Avoid premature or late speed changes.
(2) Signal well in advance of any speed reduction.

6.3 Responding to a Tailgater

(1) Gradually increase distance from the vehicle ahead in order to avoid the need for a sudden stop.

(2) If the motorcycle is travelling too slowly:

   (a) Increase speed.
   (b) Leave the highway if unable to increase speed.

(3) If speed change is not possible.

   (a) Signal the following driver to drop back.
      - Use the "slow" hand signal.
      - Acknowledge the other driver's response.
   (b) Pull off the road if tailgating persists.
   (c) Avoid:
      - Moving to the side of the lane--it may encourage closer tailgating or lane sharing.
      - Slowing way down--it exposes the operator to even greater danger.

7. Parked Vehicles

7.1 Hazards

The instructor will discuss and illustrate potential hazards created by parked vehicles.

(1) Vehicles pulling out of parking spaces.

   (a) A motorcycle is hard to spot when approached from the rear.
   (b) Cars pulling out account for a small but significant number of motorcycle accidents.

(2) Cars beginning a U-turn. The hazards above are compounded by the fact that a U-turn blocks the entire roadway and prevents an evasive maneuver.

7.2 Operating Alongside Parked Cars

Normal center lane position isolates the motorcycle from opening doors, alighting passengers, or pedestrians entering the street.

7.3 Approaching Vehicles Pulling Out

(1) Reduce speed.

(2) Change lanes or lane position to increase separation and make the motorcycle more visible.

(3) Do not attempt to pass until it is clear that the vehicle is not beginning a U-turn.

8. Range Preparation

The instructor will review briefly the activities to be performed in the next range session:

Exercise 1 - Meeting and Following Vehicles--Practice in meeting and following vehicles by adjusting speed and position.

Exercise 2 - Overtaking and Passing Vehicles--Practice in passing other vehicles and responding to passing vehicles.

Exercise 3 - Responding to Vehicles on the Side--Practice in:
   (a) Placing the cycle within the correct section of a lane of travel and adjust speed in response to vehicles from the side.
   (b) Judging the gap needed for safe entry into traffic.

Exercise 4 - General Traffic--Practice in interacting with other vehicles.

MOTORCYCLE SAFETY EDUCATION PROGRAM

UNIT	LESSON	SESSION	TITLE	MODE
II	2	2	Responding to Traffic Characteristics: Application	Range

PURPOSE

The purpose of this Lesson is to help students gain proficiency in responding to other traffic through adjustments in speed, lane usage, and positioning within lane.

CONTENT

This Session consists of the following topics:

1. Meeting and Following Vehicles
2. Overtaking and Passing Vehicles
3. Responding to Vehicles on the Side
4. General Traffic

This Session provides students an opportunity to interact with traffic under simulated road conditions. Emphasis is placed on characteristics unique to motorcycle operation such as positioning within a lane in response to other vehicles. Where possible, exercise requirements are superimposed on previous session experiences. For example, Exercise 3 requires responding to vehicles on the side under two-way traffic conditions introduced in Exercise 1.

METHODS

1. Meeting and Following Vehicles 15 minutes

(1) Purpose--The purpose of this exercise is to help students develop proficiency in meeting and following vehicles by adjusting speed and lane position.

(2) Range Layout--The exercise requires a perimeter road that permits two-way traffic. Lanes delineating traffic flow should be clearly marked. No other signs or markings are required.

(3) Exercise Procedure--The students are divided into two groups. One group is to travel each way on the perimeter road. Students are to demonstrate proper following distance, lane position responses, and speed adjustments. A maximum speed of 20 mph is imposed.

(4) Operating Procedures--The students will perform the exercise using the following procedures:

- (a) Maintain no less than a two-second following distance.
- (b) Operate in the left portion of the lane when there is no oncoming vehicle.
- (c) Move to the center lane position in the presence of an oncoming vehicle.

(5) Instruction Points--The instructor will observe for the following:

- (a) Following distance.
- (b) Lane position.
- (c) Operating speed.

(6) Method--This exercise should require only an explanation by the instructor following which the class should proceed directly to student practice.

The instructor and assistant instructor will be positioned at each end of the range and will apprise students of errors through pre-arranged signals.

2. Overtaking and Passing Vehicles 15 minutes

(1) Purpose--The purpose of this exercise is to enable students to develop proficiency in passing other vehicles and in responding to passing vehicles.

(2) Range Layout--The exercise requires a perimeter road with two full lanes for travel in one direction. The exercise configuration requirements can be met through the range layout for Exercise 1 except that traffic is in one direction.

(3) Exercise Procedure--Six pairs of students operate in one direction on the perimeter road. The second rider in each pair passes the first rider on each straightaway. The rider being passed should slow at the beginning of the straightaway to permit passing maneuvers to be completed. A pass will not be attempted if it cannot be safely completed before the end of the straightawy is reached. A maximum speed is set at 20 mph for the passing cycle and 15 mph for the cycle being passed.

(4) Operating Procedures--The exercise will be performed using the following procedures:

(a) Passing
- Begins from normal two-second following distance in left third of lane.
- Signals lane change.
- Checks the mirrors and makes a headcheck.
- Passes only if there is sufficient distance.
- Cancels signal.
- Moves quickly through blindspot.
- Checks mirrors and makes headcheck to determine when to return.
- Signals return.
- Maintains speed while returning to lane.
- Establishes lane position and separation from vehicle being passed.
- Cancels signal.

(b) Being Passed
- Observes passing vehicle in mirror.
- Moves to center track lane position.
- Maintains speed (normal conditions).
- Adjusts following distance on return to lane by passing vehicle.

(5) Instruction Points--The instructor will observe students for the following:

(a) Failure to activate or cancel signals.
(b) Lack of headcheck prior to changing lanes.
(c) Initiating a pass too close to the end of the straightaway.
(d) Passing too slowly.
(e) Returning to lane too quickly.
(f) Failure of either rider to use center position of lane while pass is taking place.

(6) Method--The instructor and assistant instructor will provide a demonstration of the exercise and operating procedures. They will then position themselves at each end of the range where they will apprise students of errors occurring on the previous straightaway.

A range meeting the requirements set forth in Course specifications should accommodate six pairs of students so long as each student has attained the objectives of previous Units. Students who lack the necessary proficiency are likely to disrupt the exercise and should not be permitted to participate. Rather, they should be assigned to the unused center portion of the range to practice basic riding skills.

3. Responding to Vehicles on the Side 15 minutes

(1) Purpose--The purpose of this exercise is to (a) help students place the cycle within the correct section of a lane of travel and adjust speed in response to vehicles from the side, and (b) judge the gap needed for safe entry into traffic.

(2) Range Layout--Exercise configuration requires a perimeter road area with a center cross road creating one standard and four T intersections (connector points with perimeter road). All lanes are to accommodate two-way traffic. Markings separating traffic flow should be clearly delineated. Right-of-way priority can be specified for intersections or signs may be used to establish right-of-way requirements.

(3) Exercise Procedure--Students will be divided into two groups. One group rides the perimeter road in a clockwise direction. The other group will begin on the perimeter road and make turns at any intersection. Students entering the perimeter road must yield the right of way to those already on it. The groups are switched after about 5 minutes. The exercise maximum speed is set at 20 mph.

(4) Operating Procedures--Students will perform the exercise using the following procedures:

Students entering the perimeter road
(a) Make proper visual checks and signals prior to entry to perimeter road.
(b) Accept safe gap.
(c) Adopt appropriate speed prior to, during and following entry to perimeter road.

Students on perimeter road
(a) Adopt lane position away from vehicle at side.
(b) Adjust speed for appropriate following distance behind entering vehicle.

(5) Instruction Points--The instructor will observe for the following:

(a) Failure to move to far portion of lane when passing vehicle at a side street (or staying there continually).
(b) Poor gap acceptance.
- Accepting an unsafe gap.
- Rejecting a safe gap.

4. General Traffic 15 minutes

(1) Purpose--The purpose of this exercise is to allow students to gain proficiency in all types of normal interactions with other vehicles.

(2) Range Layout--Same as Exercise 3.

(3) Exercise Procedures--The exercise will begin by having half the students operate clockwise and half counter-clockwise on the perimeter road. Students are permitted to make any turn desired. This will quickly produce a free traffic pattern. The following restrictions will prevail.

- (a) Students will come to a complete stop before entering the perimeter road.
- (b) The center crossroad will be treated as a four-way stop.
- (c) Students may pass whenever it is safe to do so, except for those students restricted by the instructor.
- (d) Other motorcycles will be treated as automobiles.

(4) Operating Procedures--Students will perform this exercise using all operating procedures introduced to this point.

(5) Instruction Points--The instructor will observe students generally and note any instance of improper operating behavior.

(6) Method--The instructor and assistant instructor will position themselves where they can jointly observe operations on the entire range. From this point, they will:

- (a) Apprise students of errors through hand signals.
- (b) Remove students from exercises for oral instruction.

Particularly close attention should be given to students performing passing maneuvers because of the potential hazard involved.

MOTORCYCLE SAFETY EDUCATION PROGRAM

UNIT	LESSON	TITLE
II	3	Responding to Roadway Characteristics

PURPOSE

The purpose of this Lesson is to enable students to adjust speed and position to different roadway conditions.

OBJECTIVES

Performance Objectives	Knowledge and Skill Objectives
CONFIGURATION	
Grades--The student must be able to maintain a constant speed, and shift smoothly when operating on upgrades.	The student must be able to determine the need to upshift or downshift from the response of the motorcycle, engine sound, and vibration.
Preparing--The student must be able to mount and dismount, and start the engine on a grade surface, up-down and off-camber, without dropping the motorcycle or allowing it to roll.	The student must be able to hold the motorcycle upright on a graded surface through use of the correct position, and must be able to maintain the motorcycle in a stationary position through proper use of the front brake.
Acceleration--The student must be able to accelerate from a stopped position on an upgrade without losing balance or killing the engine.	The student must be able to coordinate throttle, clutch, and brake application in order to place the motorcycle in motion on an upgrade.
Curves--The student must select an entry speed that will allow control to be maintained throughout a curve while not incurring danger from overtaking vehicles.	The student must know the relationship of curvature, surface conditions, and camber (crown, banking) upon the ability of the motorcycle to change direction. The student must be able to coordinate speed, steering and body position so as to achieve a maximum safe lean angle. The student must be able to judge from each of the above characteristics the maximum safe speed at which a curve may be entered.

Performance Objectives	Knowledge and Skill Objectives
SURFACE	
Limited Traction--The student must increase inter-vehicle separation when operating under surface conditions that limit traction.	The student must know the effect of traction limitations upon vehicle control and the possibility of collisions with other road users.
Reduced Traction--The student must operate at a speed that is appropriate to the level of surface friction.	The student must know the danger resulting from instability of the motorcycle and inability of other drivers to control their vehicles on slippery surfaces.
Surface Hazards--The student must adjust speed and position on the roadway in response to surface hazards including broken pavement, debris, and slippery spots.	The student must know the effect of various surface hazards on ability to control motorcycle.
Group Riding--The student must maintain distance from other motorcycles when riding in groups.	The student must know the nature of a staggered formation and its effect upon detectability, use of the roadway, and ability to execute maneuvers.
Group Riding--The student must signal changes in speed or direction well in advance when leading a group.	The student must know the time required by other riders to respond to signals.

CONTENT

The above objectives are met through:

Session 1 - Responding to Roadway Characteristics: Principles (Classroom)

Session 2 - Responding to Roadway Characteristics: Application (Range)

UNIT	LESSON	SESSION	TITLE	MODE
II	3	1	Responding to Roadway Characteristics: Principles	Classroom

PURPOSE

The purpose of this Session is to communicate principles for adjusting the speed and position of motorcycles to handle various roadway conditions.

CONTENT

This Session consists of the following topics:

1. Grades
2. Curves
3. Reduced Traction
4. Surface Conditions
5. Group Riding

Within each Session, content focuses on procedures for handling the various roadway characteristics through the basic maneuvers taught in Unit I. No attempt is made to deal with roadway conditions requiring higher level skills. Group Riding is included in this Session because it is the classroom session that immediately precedes the first On-Street Session.

MATERIALS

Student Materials

See Unit Specifications.

Teacher Materials

See Unit Specifications.

Instructional Aids

The following instructional aids are needed to support instruction in this Session:

Dynamic visual aids capable of illustrating the following:

- Shifting gears on upgrades and downgrades.
- The effect of reduced traction on motorcycle operation.
- The effect of uneven surfaces upon motorcycle operation.

- Procedures for handling reduced traction and uneven surfaces.

Static or dynamic visual aids capable of illustrating group riding formations.

METHODS

1. Grades

Using dynamic visual aids, preferably with sound, the instructor will illustrate and discuss the process of maintaining speed on upgrades and downgrades.

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1.1 Upgrades

(1) On many grades, it will be necessary to downshift in order to maintain speed.

  (a) Initiate downshift before engine starts to lug.
  (b) Complete shifting quickly to prevent loss of speed between shifts.

(2) On a steep hill, it may be necessary to lean forward to keep the front wheel from coming off the ground.

(3) Loss of speed

  (a) Some small motorcycles will be unable to maintain the speed of traffic on an upgrade.
  (b) A slow moving motorcycle in a fast moving stream of traffic is particularly hazardous owing to the difficulty in detecting the motorcycle from the rear.
  (c) Should keep in the right lane to allow higher speed traffic to pass.

1.2 Downgrades

(1) On long or steep downgrades, it may be necessary to downshift.

  (a) Downshifting allows engine compression to provide additional braking.
  (b) Downshifting avoids overheating of brakes on a long descent.

(2) Gear selection.

  (a) General guide: Descend in the same gear as the hill would be climbed.
  (b) Best to downshift before starting.

(3) If it is necessary to downshift while on a downgrade:

  (a) Brake before downshifting to prevent rear wheel lockup due to:
    - Engine braking.
    - Forward weight shift.
  (b) Complete the shifting quickly to avoid a speed increase while the clutch is disengaged.

(4) If it is necessary to stop, brakes must be applied gradually.

  (a) The increased momentum of the motorcycle increases the likelihood of locking the wheels.
  (b) Overapplication of brakes could cause a skid.

2. Curves

The instructor will discuss the problems and procedures involved in negotiating highway curves.

2.1 Effect of Speed

(1) Excessive speed.

  (a) Causes operator to drift outward in order to maintain balance.
  (b) Braking to reduce speed may result in a skid owing to the outward force on the rear wheel.

(2) Slowing excessively increases the motorcycle's vulnerability to following vehicles.

(3) Students will learn through experience how fast a curve may be safely taken.

2.2 Procedure

(1) Slow before entering the curve.

(2) Accelerate out of the curve.

  (a) Helps bring motorcycle upright.
  (b) Helps to return to normal highway speed.

2.3 Braking in a Curve

(1) Traffic conditions or excessive speed may necessitate braking in a curve.

(2) Use both brakes. The instructor should briefly review the discussion of front brake application occurring in Session I-2-1.

  (a) Chances of a skid are less in the case of the front wheel brake.
  (b) If surface is firm (even if wet), the danger of a fall is small.

2.4 Crowned Roads

(1) Making a left turn on a high crowned road.

(a) Necessary to turn uphill.
(b) Force of downslope added to outward force of turn.
(c) Reduced clearance between footpeg and surface.

(2) Speed must be reduced to lessen the outward force and motorcycle lean.

3. Reduced Traction

The instructor will illustrate and describe the effect of reduced surface traction upon motorcycle operation.

3.1 Effect of Slippery Surfaces

(1) Motorcycle needs a firm footing to balance on two wheels.

(2) Loss of traction results in one of the following:

(a) Fall.
(b) Loss of directional control in an attempt to maintain balance.

3.2 Slippery Surfaces

(1) Wet pavement, particularly:

(a) Just after it has started to rain and before surface oil is washed to the side.
(b) On painted lane markings, steel, and wooden surfaces.
(c) In areas where oil has dripped from cars.

(2) Gravel roads, as well as collected sand and gravel on paved roads.

(3) Mud, snow, or ice.

3.3 Avoiding Slippery Surfaces

(1) Grease strip.

- (a) Most often found near intersections where cars slow or stop.
- (b) The motorcycle should operate in the track created by car tires.
- (c) Oil may drip near the center or side of the road:
    - May cause a fall if the foot is placed in an oil spot.
    - Need to watch for oil spots when stopping or dismounting.

(2) Dirt and gravel.

- (a) Tends to collect near the edges of roadways and access ramps.
- (b) May also be pushed toward the middle of the street near corners.

(3) Some portions of the road dry faster than others.

(4) Ice in the tire tracks tends to melt faster than on the sides or in the center of the lane.

3.4 Negotiating Wet Pavement

The instructor will discuss ways of handling wet surfaces.

(1) Reduce speed.

- (a) Compensates for increased stopping distance.
- (b) Reduces forces that produce skids.

(2) Avoid sudden changes:

- (a) Braking.
- (b) Direction changes.
- (c) Shifting.

4. Surface Conditions

The instructor will illustrate and discuss operating problems involved in negotiating uneven roadway surface conditions.

4.1 Uneven Surfaces

(1) Conditions--The various types of uneven surfaces include:

(a) Chuckholes.
(b) Bumps.
(c) Railroad tracks across the road.

(2) Hazard--If crossed at too great a speed, the shock can:

(a) Unseat the rider.
(b) Cause the motorcycle to fall.
(c) Damage tires.

(3) Procedure:

(a) Approach slowly.
(b) Steer a straight path to keep motorcycle upright.
(c) Hold handgrips tight.

NOTE: The instructor should not discuss higher level skills involved in standing on pegs or raising the front wheel. These are introduced in Unit III.

4.2 Parallel Hazards

(1) Conditions--The surface conditions running parallel to the motorcycle's path include:

(a) Railroad tracks.
(b) Pavement seams.
(c) Grooves.

(2) Hazards--The potential hazard involved in approaching at too small an angle.

(a) The side of the tire rather than the tread meets the hazard.
(b) The tire is deflected rather than climbing over the hazard.
(c) Loss of steering control results in loss of balance.

(3) Procedure--The proper procedure for crossing a parallel hazard.

(a) Move a few feet away from the hazard.
(b) Turn and cross at an angle.
(c) Avoid attempting to edge across gradually.

(4) Limitation--Repositioning is only necessary in crossing a hazard that is parallel to the motorcycle.

   (a) It is not necessary to alter course for a hazard crossing the motorcycle's path. (Many students will have been told that such hazards must be crossed "head on.")
   (b) There is likely to be more danger in repositioning the motorcycle than crossing at a slight angle.

4.3 Grooves and Gratings

(1) Problem.

   (a) Explain that on rain grooves and steel gratings the motorcycle tends to "wander" back and forth.
   (b) This produces an uneasy feeling.
   (c) There is little danger as long as the surface is dry.
   (d) The best approach is to steer a straight path and "ride it out."

(2) "Weaving."

   (a) Crossing grooves and gratings at a slight angle increases stability.
   (b) Weaving back and forth, however, is potentially dangerous.
      - Requires making a turn where footing is poor.
      - Is far more hazardous than the feeling of "wandering."

(3) Wet gratings.

   (a) Steel gratings (like any steel surface) are very slippery when wet.
   (b) Should avoid crossing the wet grating if an alternative road is available.
   (c) If necessary to cross:
      - Proceed slowly.
      - Prepare to use feet for support.

4.4 Parking Areas

In parking the motorcycle, check for the following:

(1) Firmness--Make sure the surface is firm enough to bear the weight of the motorcycle before pulling onto a roadside area. Be careful of:
   - Grass.
   - Soft sand or clay.
   - Camber.

(2) Footing--Before putting the foot down, check for
- Oil spots
- Sand or gravel
- Ice spots.

(3) Support--Make sure the surface will support the motorcycle stand.
- The stand may sink into hot asphalt.
- Place a metal plate or board under the stand if necessary.

5. Group Riding

The instructor will illustrate and discuss operation of the motorcycles in groups.

5.1 Responsibilities of the Motorcyclist

(1) No more rights than individual riders.

(2) Cannot interfere with the flow of traffic.

5.2 Group Size

(1) Large groups interfere with the ability of other drivers to pass.

(2) They are easily separated by traffic lights and other vehicles.

(3) Separation produces a dangerous "catch-up" effort.

(4) Two is optimum. If larger than four, should be divided into two separate groups.

5.3 Maintaining Groups

(1) Route familiarization.

(a) Make sure all riders know the final destination and general route.
(b) Familiarization prevents hurrying if separated.

(2) Plan maneuvers in advance.

(a) Signal lane changes, turns, etc., well in advance.
(b) Start maneuvers early enough to allow all riders to complete them in time.

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(3) Put beginners up front where they can be watched by more experienced riders.

(4) "Follow" the followers.

  (a) Observe those behind in the mirror.
  (b) Drop back when following motorcycles fall behind.
  (c) This causes the group to stay with the tailenders.

5.4 Maintaining Separation

The instructor will illustrate and discuss methods of maintaining adequate separation when operating in groups.

(1) Operating side by side.

  (a) Prevents evasive maneuvers.
  (b) Illegal in most States.
  (c) Should pair up only when stopped (if permitted by State law).

(2) Staggered formation.

  (a) Leader occupies the left lane position.
  (b) Second rider occupies the right lane position well behind the first rider.
  (c) Remaining riders alternate right and left positions.
  (d) Each rider maintains a two-second following distance behind the rider directly ahead.

(3) Advantages.

  (a) Allows the group to remain compact.
    - Less likely to be separated.
    - Easier for overtaking drivers to see.
  (b) Provides ample following distance and lateral separation.

(4) Limitation--Riders must return to single file when:

  (a) In curves.
  (b) Starting turns.
  (c) Entering or leaving the highway.

(5) Passing.

  (a) Lead rider.
    - Passes.
    - Stays in left lane position.
    - Opens a gap.

(b) Second rider.
- Moves to left lane position as first rider completes pass.
- Passes when it is safe.
- Moves to right lane position.
- Opens gap.

(c) Additional riders alternate (a) and (b).

(d) NOTE: Some students may describe a procedure in which the leader, upon completing the pass, moves to the right lane position in order to leave the left position open for the second rider. If this point is raised, point out the following:
- It reverses the formation making a later realignment necessary.
- It encourages the second rider to initiate a pass before the first rider has opened an acceptable gap.
- It makes it impossible for the leader to warn following riders of unsafe passing conditions.
- The leader should move to a right lane position only if the second rider is actually in danger.

(6) Lane changes.

(a) The leader
- Waits until there is a gap that will accommodate the entire formation.
- Signals well in advance.
- Initiates lane change only after others have had a chance to see signal.

(b) Group
- Signals when the leader does.
- Changes lanes when the leader does.

(c) If a lane change is necessary and an adequate gap is unavailable:
- Leader signals and changes without waiting.
- Group changes lanes at safe opportunity.
- Formation reassembles after lane change.

6. Range Preparation

The instructor will review briefly the activities to be performed in the next range session:

Exercise 1 - Group Riding--Practice in
(a) Maintaining a group formation.
(b) Altering formation in response to roadway and traffic situations.

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Exercise 2 - Responding to Surface Conditions--Practice in adjusting speed and position to safely negotiate surface obstacles.

Exercise 3 - Interacting with Traffic and Roadway Conditions--Practice in responding to roadway conditions in the presence of other traffic.

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MOTORCYCLE SAFETY EDUCATION PROGRAM

UNIT	LESSON	SESSION	TITLE	MODE
II	3	2	Responding to Roadway Chacteristics: Application	Range

PURPOSE

The primary purpose of this Session is to help students gain proficiency in interacting properly with traffic under degraded road conditions. A secondary purpose is to familiarize students with a staggered group riding formation.

CONTENT

This Session consists of the following exercises:

1. Group Riding
2. Responding to Surface Conditions
3. Interacting with Traffic and Surface Conditions

In this Session, students respond to degraded roadway conditions by avoiding and/or crossing a variety of degraded roadway surfaces. Initially, traffic patterns are tightly controlled so that students need only respond to surface conditions. Later, students are required to respond jointly to traffic and roadway conditions.

Since this Session is the last one prior to the first On Street Session, students are provided an opportunity to familiarize themselves with operation in a staggered formation. The group riding exercise is scheduled first so as to occur before degraded surface conditions are introduced.

MATERIALS

The following materials are required in support of instruction for this Session:

1. Sand--Approximately 5 pounds.
2. Gravel--Approximately 10 pounds.
3. Strips of lathe, garden hose, etc.--Two or more lengths of at least 9 feet each.
4. Several large objects 4 inches or more in height, such as 4x4's or boxes.

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METHODS

1. Group Riding

1.1 Maintaining Formation 10 minutes

(1) Purpose--The purpose of this exercise is to help students gain proficiency in maintaining a group formation.

(2) Range Layout--This exercise requires only the perimeter road called for in the basic Range configuration described in Course Specifications.

(3) Exercise Procedure--This exercise will be performed as follows:

(a) Students are assigned to three groups of four students each.

(b) Each group will ride around the perimeter of the range in a staggered formation. For the purpose of this exercise, the perimeter road will be treated as a one-way street.

(c) The leader will perform lane changes at will. The group will follow.

(d) After approximately 5 minutes, students will rotate positions in the formation and a new student will assume the lead position.

(4) Operating Procedures--Students will perform this exercise using the following procedures:

Group Leaders

(a) Maintain at least a two-second following distance behind any other formation.

(b) Signal well in advance of a lane change.

(c) Delay the lane change until all students have had a chance to detect the signal.

Followers

(a) Operate in a staggered formation, maintaining as following distances:

- Two seconds behind the motorcycle directly ahead.
- One second behind the motorcycle in the next lane position.

(b) Initiate signals and lane changes when the leader does.

All students will perform the required visual checks.

(5) Instruction Points--The instructor will observe for the following:

(a) Failure of students to maintain proper following distance.

(b) Insufficient delay between leader's signal and lane change.

(c) Failure of individual students to change lanes with the leader.

(6) Method--After giving instructions, the instructor and assistant instructor will position themselves where they can jointly observe all formations. After approximately 5 minutes, the instructor will summon each group individually in order to (a) provide instruction, and (b) rotate positions within the formation.

1.2 Altering Formation 10 minutes

(1) Purpose--The purpose of this exercise is to help students gain proficiency in altering the formation in response to roadway and traffic situations.

(2) Range Layout--This exercise requires a perimeter road and cross street as described in Course Specifications.

(3) Exercise Procedure--The exercise will be performed as follows:

(a) Students will remain in the same groups as in Exercise 1.1, rotating positions so as to obtain a new leader.

(b) The group will operate about the range in a staggered formation, following a course set by the group leader.

(c) For this exercise, the following conditions prevail:

- All streets are two-way streets.
- Groups entering the perimeter road will come to a complete stop.
- A cross street will be treated as a four-way stop.

(d) After approximately five minutes, students will rotate position to allow the remaining student in each group to assume the position of the leader.

(4) Operating Procedures--Students will perform the exercise using, in addition to those procedures identified in 1.1, the following:

Group Leader

(a) Initiate entry into a stream of traffic only when there is sufficient gap to accommodate the entire group.

(b) Signal others to pull off if the group is separated.

Followers

(a) Change to single file on all turns.

(b) Assume a two abreast formation while stopped.

(c) Make individual gap acceptance judgments.

All students will observe following students in their mirrors and drop back should one student fall behind.

(5) Instruction Points--Instructor will observe students for the following:

(a) Failure to take turns single file.

(b) Failure to double up at stopping points.

(c) Failure to drop back for stragglers.

(6) Method--See Exercise 1.1.

2. Responding to Surface Conditions 20 minutes

(1) Purpose--The purpose of this exercise is to allow students to obtain experience in adjusting speed and position of the motorcycle to safely negotiate surface obstacles.

(2) Range Layout--The basic layout of this exercise is as described in Exercise 1.2. However, for the purpose of the exercise the following will be added to the surface of the Range:

(a) A thin sand cover at several points. The sand should be spread such that it covers the entire lane, thereby forcing students to cross it rather than circumvent it.

(b) Several spots of loose gravel placed:

- Near the inside edge at corners.
- Near the center of the road at intersections.

(c) Large objects placed in a position that will require the student to alter course in order to circumvent them.

(d) Strips (lathe, etc.) placed as follows:

- Across the road at a slight angle.
- Between lanes at a point where students are forced to make a lane change.

Note: Prior to the beginning of this Session, materials should be placed off of the traveled surface but near the spots that they will be used. Students may assist in placing the materials following completion of the Exercise 1.2.

(3) Exercise Procedure--The exercise will be performed as follows:

(a) Students will proceed around the range in single file.

(b) The leader may take any course desired, subject only to the restriction that the path does not cross that of following students.

(c) Students respond to various surface conditions as they deem appropriate, ignoring the path taken by preceding students.

(d) Students will be rotated through the lead position.

(4) Operating Procedures--The exercise will be performed using the following procedures:

(a) All communication and observational procedures taught in Lesson II-1.

(b) Avoiding large obstacles and gravel spots.

(c) Reducing speed upon approach to sandy spots, maintaining direction and speed (no braking) while crossing them.

(d) Negotiating without change in speed or direction those strips placed across the lane.

(e) Negotiating at a slight angle those strips placed parallel to the lane.

(f) Maintaining a two-second following distance, adjusting speed for students slowing ahead.

(5) Instruction Points--The instructor will observe for these errors.

(a) Altering direction to approach cross strips head-on.

(b) Edging across parallel strips.

(c) Unnecessary slowing for strips or large obstructions.

(d) Attempting to circumvent rather than cross sandy areas.

(6) Method--The instructor should explain but not demonstrate the procedures to be employed in dealing with various surface conditions.

While students are operating about the range, the instructor and assistant instructor should move about the range so as to observe students negotiating each of the surface conditions. Students making repeated errors should be summoned to the side by the instructor or assistant instructor to be given individual coaching.

Both the instructor and assistant instructor should keep an eye out for advanced students attempting to surmount the large obstacles or engaging in competition with one another.

3. Interacting With Traffic and Roadway Conditions 20 minutes

(1) Purpose--The purpose of this exercise is to help students gain proficiency in responding to roadway conditions in the presence of other traffic.

(2) Range Layout--Same as Exercise 2.

(3) Exercise Procedure--Students will operate freely about the range subject to the following:

(a) Students will come to a complete stop before entering the perimeter road.

(b) The center cross street will be treated as a four-way stop.

(c) All streets are two-way streets.

(d) Passing is prohibited.

(e) Other motorcycles should be treated as automobiles.

(4) Operating Procedures--Students will perform this exercise using all operating procedures introduced to this point.

(5) Instruction Points--The instructor will observe students for following:

(a) Obstructing traffic in another lane while circumventing an obstacle.

(b) Obstructing following traffic by unnecessary slowing.

(c) Failure to make an optimum compromise between other vehicles and obstructions.

(6) Method--The following instructional methods will be employed:

(a) Students will be instructed in the exercise procedure. However, operating procedures need not be reviewed.

(b) The instructor and assistant instructor will position themselves nearest the points of greatest potential problem (e.g., obstacles necessitating a lane change), but will observe the entire range area.

(c) Students will be advised of minor errors (e.g., failure to cancel turn signal) through hand signals.

(d) Students making serious or repeated errors will be summoned by the instructor or assistant instructor for individual coaching.

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UNIT	LESSON	TITLE
II	4	Street Riding Strategies

PURPOSE

The purpose of this Lesson is to enable students to adjust speed and position in order to optimize the ability to see, be seen by, and maintain a safe distance from, other road users while responding to various roadway conditions.

OBJECTIVES

Performance Objectives

Optimize Speed and Position--The student must be able to select a speed, lane and position within lane that is appropriate to all combinations of roadway and traffic conditions.

Knowledge and Skill Objectives

The student must be able to make compromises among various roadway and traffic conditions to adopt the speed and position that will optimize the ability to observe, communicate and react to roadway and traffic characteristics.

CONTENT

The above objectives are met through:

Session 1 - Street Riding Strategies: Principles (Classroom)

Session 2 - Beginning Street Riding (Range)

Session 3 - Intermediate Street Riding (Range)

MOTORCYCLE SAFETY EDUCATION PROGRAM

UNIT	LESSON	SESSION	TITLE	MODE
II	4	1	Street Riding Strategies: Principles	Classroom

PURPOSE

The purpose of this Session is to communicate principles for optimizing motorcycle speed and position in terms of the need to see, be seen by, and maintain a safe distance from, other road users, and to respond to various roadway conditions.

CONTENT

This Session presents no additional information but allows students to develop and apply principles for optimizing speed and position through a variety of traffic situations.

MATERIALS

Student Materials

Student materials for this Session would differ from those of most other Sessions in that, instead of providing information, they would present traffic situations similar to those described in the following paragraphs under METHOD. Their purpose would not be to prepare students for classroom instruction but to extend the range of content by providing more situations than can be offered in a single classroom session.

Teacher Materials

See Unit Specifications

Instructional Aids

Various traffic situations to which students are required to react may be presented through the use of a chalkboard, traffic board, or other visual aids. If dynamic visual aids are used, they must be capable of freeze frame presentation as described in the Unit Specifications.

The more complex traffic situations involved in this Unit will not generally be capable of being depicted from a driver point of view. Therefore, the use of motorcycle controls as a student response mechanism, as described in Unit Specifications, would not be appropriate.

METHODS

1. General Guidelines

The instructor should introduce various traffic situations and call upon students to provide and discuss various motorcycle operator responses. The following general guidelines are offered:

(1) Discussions should consider only the motorcycle operator's response, not what drivers should do.

(2) Responses should anticipate errors but not malevolence on the part of drivers.

(3) Situations should be presented in an order of increasing complexity, as determined by:

  (a) Number of potential hazards represented.
  (b) Number of responses involved.
  (c) Degree of compatibility or alternative responses.

(4) Inappropriate solutions should be corrected. The purpose of the Session is to develop knowledge and skill, not to provide an exchange of opinions.

The following examples are provided for illustrative purposes only.

2. Identical Responses

Traffic situations calling for the application of principles that involve the same general purpose.

Situation	Response
Oncoming truck	One response, assuming a center lane position, would both provide separation from the truck and allow the motorcycle to be seen by any driver about to pass the truck.
Entering a left hand curve	One response, entering in the right lane position, would allow the rider to see, be seen, and maximize separation from any oncoming vehicle drifting over the center line.

3. Compatible Responses

Situations calling for application of principles that lead to different, but compatible responses.

Situation	Response
Following car ahead; oncoming vehicle signalling left	Two compatible responses are (1) maintain left position on approach to be seen by oncoming drivers; and (2) move to a center position upon reaching the intersection in order to maximize separation.
Car ahead turning left; oncoming vehicles signalling left	Two compatible responses are (1) slow to allow car ahead to clear path so motorcycle can be seen; and (2) move right to increase separation and ability to be seen by oncoming driver.

4. Separation

Traffic situations presenting two or more hazards that can be separated; that is, taken one at a time.

4.1 Separation of Hazards by One Response

Situation	Response
Approaching an oncoming truck and steel grating	Slowing will separate the two hazards; that is, it will allow the truck to pass before the grating is encountered.

4.2 Separation of Hazards and Responses

Situation	Response
Car at side street out on the right; single oncoming vehicle on left	Two different responses are needed: (1) slow and move right while oncoming car passes; and (2) move left while passing vehicle at the right.

5. Compromising

Situations calling for a response that compromises between the risks presented by two potential hazards.

Situation	Response
Approaching an intersection with cars poised to enter both right and left lanes	Moving to a center position in the roadway will optimize separation and ability to be seen by drivers of both vehicles.
Truck stopped in left lane; vehicle about to pull out on right	Slowing and steering a center course between the two vehicles will compromise between the risk of the car pulling out and someone passing the truck.

6. Trade-Offs

Selecting the course of least risk when facing two potential hazards.

Situation	Response
City street; line of traffic on left and parallel parked cars about to pull out on the right	Maintaining a left lane position will maximize separation and ability to be seen by the driver about to pull out. The oncoming vehicles are not likely to cross the center line on a city street, and are, therefore, a lesser risk.
About to turn off a high-speed highway being closely followed	Move right; the danger posed by lane sharing is less than that of being rear-ended.

7. Preparation for Street Riding

Information relative to the following should be provided in order to prepare students for the street riding Session that follows.

7.1 Student Responsibilities

(1) Where to report.

(2) Time to report (street riding sessions are divided into two one-half hour meetings.

(3) Permits or licenses that must be in student's possession.

7.2 Preview

(1) General area in which riding will occur.

(2) The general characteristics of the route to be travelled.

7.3 Signals

Additional signals to be used in street riding include the following:

(1) Turn left
(2) Turn right
(3) Speed up
(4) Slow down
(5) Pull over
(6) Cancel turn signal
(7) Close up
(8) Drop back
(9) Disregard previous signal

MOTORCYCLE SAFETY EDUCATION PROGRAM

UNIT	LESSON	SESSION	TITLE	MODE
II	4	2	Beginning Street Riding	Street

PURPOSE

The purpose of this Session is to provide students an experience in applying basic street riding practices in a street environment that imposes minimal demands on rider capability.

CONTENT

Students apply, within the roadway traffic environment, the skills and knowledges involved in seeing, being seen by, and communicating with other drivers. Because of the 3:1 student teacher ratio, it will be necessary either to obtain the services of two additional Instructors or schedule two periods for the Session.

As noted in Unit I Proficiency Assessment specifications, an assessment of basic skill should be given just before this Session. Whether it involves administration of a formal test or simply a subjective appraisal of ability based upon observation of student performance in preceding Range Sessions, is subject to the time and instructor considerations discussed in Course specifications.

MATERIALS

Student Materials

In addition to the materials identified in Unit and Course Specifications, students will require the following for this Session:

(1) Route Guidance--Guidance on the specific route to be taken during the Session. This guidance will not only aid the student leader in following the route, but will aid anyone separated from the group in re-joining the formation.

(2) Street Riding Rules--General rules for street siding, including the following:

(a) Hand, horn, or other signals to be used:
- By instructors to communicate route guidance and provide instructional information (e.g., cancel signals).
- By students to communicate problems to the instructor.

(b) Conditions covering separation from the formation, including:
- When to separate .
- Rejoining the formation.

(c) Procedures for altering the formation:
- Rotating positions.
- Pulling off the road for critique.

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(d) Emergency procedures, including:
  - Engine trouble.
  - Flat tire.
  - Running out of fuel.

Teacher Materials

In addition to the material requirements identified in Unit and Course Specifications, teachers will require the following materials for this Session:

(1) Route Selection--Guidance on selection of routes including:

  (a) Types of observations to be made.
  (b) Types of location and times of day when observations are best made.
  (c) Methods of selecting specific routes, including:
    - Preliminary planning (e.g., use of maps).
    - Sequencing observational locations.
    - Verifying conditions (e.g., checking for "no left turns" at certain hours).

(2) Check Lists--Lists of observations of the specific performances to be observed at various points along the road. Since the instructor will be engaged in operating the motorcycle and observing students, it will be necessary to commit to memory (a) the route that is to be taken, (b) the observations that are to be made, and (3) the correct responses and errors that occur. A check list will help to refresh the instructor's memory both prior to the Session and during the critiques of individual student performances.

(3) Scratch pads on tank or attached to right knee for notes.

Instructional Aids

None

EQUIPMENT

The communication equipment described in the Course Specifications is of particular value in this Session owing to (a) the difficulty in communicating with students through hand or other signals, (b) the need to provide route guidance as well as instructional information, (c) the possibility that some students will become separated from the instructor, and (d) the relatively greater potential hazard. The fact that six, rather than 12, students will be operating at one time makes the use of radio communication equipment somewhat more feasible for on-street than range instruction.

Vests or signs identifying riders as being participants in a motorcycle safety education program may also be provided.

METHODS

(1) Purpose--Same as Session purpose.

(2) Route Requirements--Route requirements should be met through using a residential area with the following characteristics:

(a) Roadway--Good surface conditions, including common markings; controlled and uncontrolled standard intersections and "T" intersections; intersections with good visibility; wide lanes for travel; relatively flat area with only moderate inclines.
(b) Traffic--Two-way, low-volume and low-speed traffic; standard passenger vehicles; traffic volume should permit periodic meeting, following, and intersecting with other vehicles.
(c) Sequence--The route segment should generally correspond to the following sequence:
- Straight, uninterrupted travel.
- Straight travel with stops.
- Turns from a stop.
- Turns from uncontrolled intersections.

(d) Length--The route should be 20-30 minutes in length, if possible, including access time from the training facility. Segments of the route may be used more than once to provide a comprehensive experience for a lead rider in the formation.

(3) Exercise Procedure--The exercise will be performed as follows:

(a) Students will operate in a staggered formation consisting of the instructor and three students.
(b) One student will assume the lead position and will follow a route indicated by the instructor.
(c) Approximately every 10 minutes, students will pull to the side of the road for an individual critique of performance and to allow another student to assume the lead position.

(4) Operating Procedures--The following items should be stressed and used to guide the Session critique in rider groups.

Lead Rider
(a) Shifting
- Operating in appropriate gear.
- Controlling direction while shifting.

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(b) Stopping
- Stopping smoothly where required.

(c) Directional Control
- Maintaining path on roadway without weaving.

(d) Turning Control
- Operating within configuration imposed by intersections.

(e) Legal Operation
- Operating in a legal manner when stopping and in right-of-way situations.

(f) Operating Devices
- Using cycle devices without taking eyes off the road.

(g) Changing Lanes
- Changing only where permissible.
- Employing correct procedures.
- Providing an advanced signal.

(h) Responding to Oncoming Vehicle
- Reducing speed, if necessary.
- Increasing lane separation.

(i) Responding to Following Vehicles
- Keeping formation in view.

(j) Following Vehicle Ahead
- Keeping to two-second distance.

(k) Gap Acceptance in Entry to Traffic
- Using turn signals when appropriate.
- Cancelling signals after direction change.
- Operating with headlight on.
- Using horn, if necessary.
- Using brake light to warn of speed and possible direction change.

(l) Checking Operating Environment
- Looking well ahead.
- Checking intersections.
- Checking mirrors routinely and before changing direction.

Followers

(a) Maintaining Formation
- Two-second following distance from rider ahead.
- One-second following distance from rider in adjacent lane position.

(b) Altering Formation
- Pairing up at intersections.
- Single file on curves and corners.

(c) Separating where necessitated by traffic signals, insufficient gaps.

(5) Instruction Points--The instructor will focus attention primarily upon errors made by the lead rider. The leader is the only student who can be called upon to apply knowledges and skills involved in interacting with traffic and roadway conditions. The remaining students do largely what the leader does. They are present only to (a) make it unnecessary to return to the starting point every ten minutes, and (b) gain experience in operating the motorcycle in the presence of other vehicles.

Since the instructor will observe essentially all of the leader's responses, any errors should be noted and the student apprised of them. The instruction points, therefore, encompass all operating procedures. Instruction points relative to other students in the group will be limited to those errors that the instructor happens to notice.

(6) Method--The method of instruction employed in this Session may be divided into three categories: preparation, observation and control, and critique.

Preparation

Prior to on-street instruction with each group, the instructor should carry out the following preparation activities.

(a) Check Operator's Permit--Check to see that all students possess a valid motorcycle operator's permit or endorsement.
(b) Check Communications--Check any communication equipment and make sure students are able to use it properly. Review other on-street communication techniques including signals for the following:
  - Turn left
  - Turn right
  - Speed up
  - Slow down
  - Pull over
  - Cancel turn signal
  - Close up
  - Drop back
  - Disregard signal
(c) Check Motorcycles--Cycles should be inspected and meet requirements for on-street use. Students should also perform a standard motorcycle inspection before operation.
(d) Check Student Identifiers--Vests or jackets identifying student riders should be available.
(e) Route Review--The requirements and general course to be followed on street should be presented.

(f) Rider Assignment--Formation assignments and general procedures for changing assignments should be identified.

Observation and Control

The instructor should be positioned to observe and control students in the formation. The third or fourth position in a formation generally meets these requirements. The first position (lead rider) should be avoided since this slot is the most critical for students to occupy for learning to ride on-street. Positioning in the second rider slot (right wheel track) makes it difficult to observe and control the student in position four.

If the group becomes separated, the instructors should signal students to pull off to the side of the road immediately. Should the stragglers fail to appear (e.g., engine trouble), the students should stay put while the instructor looks for them.

Critique

If communication equipment is available, students should be informed of errors immediately. This has the advantage of (a) providing immediate feedback, (b) assuring the errors are noted (rather than being forgotten by the instructor), and (c) allowing students to benefit from the leader's mistakes.

Where communication equipment is not available, it will be necessary to pull off to the side of the road for a critique. During the first on-street session, this should occur after every few maneuvers. In later sessions, the critique can be limited to the points where the formation leaves the road to change positions.

To maximize riding time, the critique should be made as brief as possible. This may be done by:

(a) Confining comments to errors and avoiding use of the roadside as a place to provide instruction.
(b) Dealing only with those errors that are relatively critical and unique problems for particular students, and allowing more common errors to be summarized at the end of the session.

MOTORCYCLE SAFETY EDUCATION PROGRAM

UNIT	LESSON	SESSION	TITLE	MODE
II	4	3	Intermediate Street Riding	Street

PURPOSE

The purpose of this Session is to enable students to apply street riding practices in normal operating environments.

CONTENT

This Session is designed to permit students to continue to apply skills developed during range instruction in the street environment. The environment becomes slightly more demanding than in Session 2, but is well within the requirements imposed by normal traffic conditions. A city fringe area and highway route segment characterized by moderate traffic and low operating speeds should be used.

MATERIALS

The materials required in this Session are the same as those described in Session II-4-2, differing only with respect to those characteristics that reflect the specific nature and location of street routes.

EQUIPMENT

Same as II-4-2.

FACILITIES

This Session takes place on public highways in two general areas: (a) an urban area characterized by light to moderate traffic, and (b) open highway. These two environments are most likely to be found in proximity to one another either in a small city or on the outskirts of a large city. It may be necessary to move the motorcycles to one of these locations from their storage area.

METHODS

(1) Purpose-- Same as Session Purpose.

(2) Route Requirements--Route requirements should be met through use of areas with the following characteristics:

Urban Light Traffic

(a) Roadway--The roadways that comprise the selected route should have the following characteristics:
- Good surface.
- Well marked.
- One-way and two-way, two-lane and multi-lane streets.
- Unprotected intersections requiring entry into, and turns across traffic flow.
- Visibility restrictions at some intersections.
- Small to moderate hills.

(b) Traffic--The route should provide a moderate traffic volume, consisting almost entirely of automobiles. Prevailing speed should be 25-35 mph.

(c) Sequence--To the extent possible, the route segments should generally correspond to the following sequence:
- Straight two-way streets.
- Straight one-way streets.
- Signalized intersections, two-way to two-way.
- Intersections, two-way to one-way, or one-way to two-way.
- Non-signalized intersections.
- Non-signalized intersections with visibility restrictions.

(d) Length--The route segment need only cover a few blocks. Portions of the route may be reused as necessary to generally follow the instructional sequence and provide as varied an experience as possible for each student as formation leader. A group should be able to negotiate the route in approximately 10-15 minutes.

Highways

(a) Roadway--The roadway should have the following characteristics:
- Good surface.
- Well marked.
- Multi-lane.
- Infrequent intersections, all signalized.
- Curves, posted and unposted.
- Hills of small to moderate grade and lanes.

(b) Traffic--The route selected should provide a light to moderate volume of traffic, consisting almost entirely of automobiles (i.e., no truck route). Speed limit should not exceed 40 mph.

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(c) Sequence--To the extent possible, route segments should be approved according to the following sequence:
- Open road without traffic or signals.
- Gradually increasing frequency of signals and volume of traffic.
- Protected turns.
- Curves and hills.
- Unprotected turns.

(3) Exercise Procedures--Same as II-4-2.

(4) Operating Procedures--Same as II-4-2.

(5) Instruction Points--Same as II-4-2.

(6) Method--The method employed in this Session is essentially the same as that described in II-4-2, the major difference being that fewer stops for a critique would be scheduled, owing to (a) the increased proficiency and lowered anxiety of students, (b) the need to cover more ground during the Session, and (c) the relatively greater difficulty in finding appropriate places to pull off the road.

UNIT III. STREET RIDING SKILLS

PURPOSE

The purpose of this unit is to enable students to acquire the advanced skills required in handling complex motorcycle, roadway, and traffic related conditions, and in carrying passengers and cargo.

CONTENT

Lesson 1 - Motorcycle Related Skills

Session 1 - Motorcycle Related Skills: Procedures (Classroom)
Session 2 - Motorcycle Related Skills: Skill Development (Range)

Lesson 2 - Roadway-Traffic Related Skills

Session 1 - Roadway-Traffic Related Skills: Procedures (Classroom)
Session 2 - Roadway-Traffic Related Skills: Collision Avoidance (Range)
Session 3 - Roadway-Traffic Related Skills: Obstacle Surmounting (Range)
Session 4 - Advanced Street Riding (Street)

This unit focuses upon range instruction intended to allow students to develop the advanced manipulative skills demanded by various unusual motorcycle, roadway, and traffic conditions. Classroom instruction supports range activities by acquainting students with the procedural components of the activities to be performed.

This unit also includes a street riding session, the final one in the Course. Students are required to operate in dense city traffic and on high speed highways and expressways.

PREREQUISITES

In order to undertake instruction in Unit III, students must have met all objectives of Unit I. Students whose basic control skills are marginal will be unable to cope with range instruction in this Unit.

In order to participate in the street riding session (III-2-4), students must have performed satisfactorily in the two street riding sessions of Unit II.

METHODS

This unit places primary emphasis upon student practice of exercises designed to develop advanced manipulative skills. Instruction takes two forms:

(1) Extension of basic motorcycle control skills needed to permit rapid and violent maneuvers including quick stops and sharp turns.

(2) Development of new skills including obstacle surmounting, carrying passengers and cargo, and coping with various motorcycle conditions.

The various exercises provide situations that will allow students to develop skills in a manner that minimizes chances of injury. Those activities involving greatest potential hazard--quick stops, quick turns, and surmounting obstacles--are performed one at a time under the close supervision of the instructor.

Classroom instruction is concerned largely with review and discussion of those procedures underlying skill development. Additional classroom techniques include (1) illustration of activities to be performed during range instruction as well as their real world counterpart, (2) classroom drills to allow implicit practice of activities that cannot be performed on the range.

On-street instruction follows the same general pattern as set forth in Unit II specifications. Because of the conditions under which it takes place--dense traffic and high speed highways--the questions raised in Unit II regarding student safety apply with even greater force. The defense remains unchanged--that the hazards are ones that will confront motorcycle operators in the highway traffic environment, and are best experienced first under the close supervision of an instructor. Additional aspects of instructional method are described in the specifications for the Street Riding Session (III-2-4).

MATERIALS

Student Materials

In addition to student materials identified in Course specifications, requirements for Unit II include the following:

(1) Independent Practice Guides--Guidance covering activities that may be performed outside of and following the course in order to maintain skill levels. The high levels of skill required, coupled with the infrequency with which they are performed in the highway traffic environment, leads to a need for frequent practice if proficiency levels are to be maintained.

Student materials must identify the following:

(a) Areas where practice may safely take place.
(b) Precautions to be employed relative to surface conditions and other traffic.
(c) Exercises that may be performed in order to maintain proficiency.
(d) Methods for self diagnosis of errors.

(2) Street Procedures--Procedures to be employed in on-street instruction (Session II-2-4).

Teacher Materials

In addition to teacher materials identified in Course specifications, teachers will require guidance in the selection of routes for on-street instruction.

Instructional Aids

Instructional aids required by this unit may be characterized as follows:

(1) Demonstration Aids--Aids that permit the instructor to demonstrate the performances that serve as objectives of instruction. These performances may be illustrated in either the highway traffic environment or in the context of range exercises--or both.

All of the requirements are capable of being met through static pictures or diagrams of the conditions that require the performances, the operator's performance, and the performance of the vehicle. Dynamic visuals would have some advantage in providing an illustration of an entire response pattern in real time. However, the presentation must provide for stop action at various points in the response pattern so that individual responses may be fully discussed.

(2) Explanatory Aids--Aids that illustrate the advantages of performing activities in the manner prescribed, e.g., illustration of stopping distances using rear brake versus both brakes.

EQUIPMENT

The motorcycle and projection equipment identified in Unit II Specifications are required in addition to equipment items identified in Course Specifications.

FACILITIES

Range facilities set forth in Course Specifications are required to support instruction in this Unit. In addition, appropriate street routes must be selected to support on-street instruction. Route requirements are described in Session III-2-4.

MOTORCYCLE SAFETY EDUCATION PROGRAM

UNIT	LESSON	TITLE
III	1	Motorcycle Related Skills

PURPOSE

The purpose of this lesson is to enable students to acquire the advanced skills required in handling complex motorcycle conditions and in carrying passengers and cargo. The range session of this lesson also includes two exercises intended to develop advanced vehicle control skills required in the following lesson (Unit III-2, Roadway-Traffic Related Skills).

OBJECTIVES

Performance Objectives	Knowledge and Skill Objectives
Symptom recognition--a student must be able to recognize symptoms of conditions likely to affect control of the motorcycle.	The student must know the symptoms of low tire pressure, engine overheating, or common causes of power loss, including lack of fuel and fouled spark plugs.
Malfunctions--the student must be able to maintain control of the motorcycle in the event of a stuck throttle, brake or headlight failure, blow out, wheel wobble, or broken cables.	The student must be able to initiate appropriate control responses immediately and carry them out rapidly while maintaining control of the motorcycle's speed and direction.
Fuel adjustments--the student must be able to adjust the choke and switch the fuel valve to the "reserve" position while the motorcycle is in motion.	The student must be able to locate and manipulate the choke and fuel valve without looking away from the roadway.
Running starts--the student must be able to start the motorcycle by putting it in motion through "jump" or "bump" starting, or being pushed by someone else.	The student must know the hazards involved in incorrect running starts including pushing starts. The student must be able to "jump" start the motorcycle.

MOTORCYCLE SAFETY EDUCATION PROGRAM

UNIT	LESSON	SESSION	TITLE	MODE
III	1	1	Motorcycle Related Skills: Procedures	Classroom

PURPOSE

The purpose of this Session is to communicate procedures for dealing with motorcycle-related conditions that require advanced skill.

CONTENT

This Session consists of the following topics:

1. Unit and Session Overview
2. Engine Problems
3. Motorcycle Related Emergencies
4. Carrying Passengers
5. Carrying Cargo
6. Range Preparation

MATERIALS

See Unit Specifications.

EQUIPMENT

See Unit Specifications.

FACILITIES

See Unit Specifications.

METHODS

1. Unit and Session Overview 5 minutes

The instructor will provide a brief overview of Unit and Lesson content.

1.1 Unit Overview

(1) Objective is to develop the advanced vehicle control skills needed to cope with non-routine conditions.

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(2) Conditions

- (a) Motorcycle-related conditions.
  - Engine problems.
  - Emergencies.
  - Carrying passengers.
  - Carrying cargo.
- (b) Roadway-related conditions.
  - Slippery and resistive surfaces.
  - Surface obstacles.
  - Windbreaks.
  - Flying objects.
- (c) Traffic-related conditions.
  - Quick stops.
  - Quick turns.

(3) Sessions

- (a) Motorcycle conditions.
  - One classroom.
  - One range.
- (b) Roadway and traffic conditions.
  - One classroom
  - One range
- (c) Street riding.

1.2 Session Overview

(a) Motorcycle breakdowns.
(b) Motorcycle emergencies.
(c) Carrying passengers.
(d) Carrying cargo.

2. Engine Problems 10 minutes

The instructor will illustrate and discuss procedures for dealing with common engine problems.

2.1 Hard Starting

(1) Ignition/fuel controls

- (a) Kill switch (most common cause).
- (b) Fuel valve.
- (c) Fuel supply
  - Open gas cap and look.
  - Lean vehicle and listen for sloshing sound.

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(2) Engine flooding

(a) Smell of fuel indicates possible flooding.
(b) Turn fuel valve off.
(c) Open throttle completely.
(d) Kickstart until engine fires.
(e) Open fuel valve
- After starting.
- After several kicks if engine fails to start.

(3) Replace spark plug

(a) Common cause of hard starting on one cylinder and two-stroke engines.
(b) Should carry a spare plug.

(4) Jump Starting

(a) Start at the top of a downgrade if possible.
(b) Squeeze clutch.
(c) Place motorcycle in second gear.
- First gear may cause rear wheel to lock up when clutch is released.
- May be necessary to switch to first gear if unable to start in second.
(d) Push motorcycle to gain momentum.
(e) Mount motorcycle quickly.
(f) Release clutch
- On flat surface, release quickly to allow engine to fire before it slows the motorcycle down.
- On a hill, release the clutch gradually to prevent rear wheel lock-up due to speed and downgrade.
- Open throttle as soon as engine starts.

NOTE: An alternative procedure is to run alongside the motorcycle and continue pushing as the clutch is released. This procedure should not be taught to novices, since the motorcycle may get away from the operator if the clutch is not squeezed as soon as the engine starts.

2.2 Switching to Reserve Fuel Supply

(1) Problem

(a) If fuel switch is in "On" position, the fuel supply will stop once the fuel drops below a certain level.
(b) Must switch to "reserve" position for additional fuel.

(2) Symptom

- (a) Engine sputters and stops abruptly.
- (b) Easy to identify when fuel supply is known to be low.

(3) Procedure

- (a) Keep eyes on the road ahead.
- (b) Reach down and feel for fuel valve.
- (c) Turn to reserve

(4) Need for practice in order to:

- (a) Locate fuel valve.
- (b) Turn in the correct direction.
- (c) Turn it to the correct position (often against a stop).

2.3 Overheating

(1) Symptoms

- (a) Smell of burning oil or rubber.
- (b) Smoke.

(2) Pull off the road and stop as soon as safely possible.

(3) Check oil and cooling fins.

2.4 Oil Loss (four cycle engines)

(1) Symptoms

- (a) Engine labors and loses power.
- (b) Some motorcycles have an oil warning light that goes on when oil pressure drops.

(2) Procedure

- (a) Squeeze clutch.
- (b) Turn off engine with cut-off switch.
- (c) Pull off the road.
- (d) Check oil supply (there may be a malfunction in the warning system).
- (e) If low, replenish before continuing.

(3) Operation of engine without adequate oil supply may result in engine seizure.

3. Motorcycle Related Emergencies 20 minutes

The instructor will illustrate and discuss procedures for handling emergencies resulting from motorcycle malfunction.

3.1 Collision Prevention

The instructor should emphasize that the operator's first concern in any malfunction-related emergency is to avoid a collision with another vehicle or fixed object.

(1) Keep the eyes on the road and traffic; don't become preoccupied with the motorcycle.

(2) Don't risk a collision in an effort to correct the problem.

(3) Check traffic behind and give signal (if time permits).

(4) Get out of traffic and well off the roadway as soon as possible.

(5) Do not continue until absolutely sure the problem has been corrected.

3.2 Rear Wheel Lock

(1) Common causes

(a) Broken chain.
(b) Engine or transmission seizure due to lack of lubrication.
(c) Object caught between chain and sprocket.

(2) Procedure

(a) Squeeze clutch as this may allow the rear wheel to roll again.
(b) Concentrate on maintaining a straight path (skid control will be taught and practiced in Lesson III-2).

3.3 Blow Out

(1) Front tire

(a) Symptoms
- Steering will feel heavy.
- Handlebars may pull to one side if tire twists on rim.

(b) Minimize weight on front tire
- Avoid braking.
- Close throttle slowly.
- Shift weight to rear.

(c) Wait until moving slowly before attempting to leave the roadway.
(d) Coast to a stop.

(2) Rear tire

(a) Symptom--Rear will tend to fishtail.
(b) Avoid braking--Excessive lightening of rear wheel may result in skidding.
(c) Concentrate on maintaining a straight path if in a rear wheel skid.

3.4 Throttle Stuck Open

(1) Problem--Kink in throttle cable may prevent closing.

(2) Procedure

(a) Squeeze clutch (Note: Experts disagree on the best procedure. Many object to disengaging the clutch on the grounds that it may damage the engine or cause it to run out of control. It is recommended for students because it is consonant with the general instruction to squeeze the clutch whenever trouble develops. If the path ahead is clear and there is no danger of losing control, an experienced rider may be encouraged to bypass this step and proceed to those that follow.)
(b) Work throttle back and forth in attempting to close it.
(c) If throttle does not free up, use the engine cut-off switch.
(d) Apply brakes.
(e) Pull to the side of the road and stop.
(f) Check the throttle cable and make sure the throttle is working freely before continuing.

3.5 Wobble

(1) Problem--At moderate to high speeds, front wheel may suddenly wobble violently from side to side.

(2) Procedure

(a) Grip handlebars firmly but don't "fight" the wobble.
(b) Avoid braking--it could make the wobble worse.
(c) Ride it out--let the motorcycle slow down gradually.
(d) Pull off the road.

(3) Check for the following before continuing:

  - (a) A wheel that is bent or out of alignment.
  - (b) Loose steering.
  - (c) Loose wheel bearing.
  - (d) Loose spokes.
  - (e) Cargo loaded improperly.

(4) If the trouble isn't found, keep speed down until motorcycle can be checked out by mechanic.

3.6 Classroom Drill

If instruction is to be of any use to students, it should be at a high threshold of recall. Students should be drilled by having the instructor call out an emergency condition and requiring students to furnish appropriate responses quickly.

4. Carrying Passengers 15 minutes

4.1 Requirements for Passenger Carrying

Emphasis should be given to the need for the following requirements to be met before passengers are carried.

(1) Operator experience

  - (a) Problem--Passengers affect the handling characteristics of the motorcycle.
  - (b) Experience--Should have several hundred operating miles before attempting to carry a passenger.
  - (c) Learning--Should start with a lightweight passenger (100 pounds or less).

(2) Passenger Requirements--Passengers should meet the following requirements:

  - (a) Be old enough to reach footpegs and understand instructions--no very small children.
  - (b) Be able to ride--not ill, tired, intoxicated.
  - (c) Willing to follow instruction.

4.2 Equipment

The equipment required for safety, and by law in most States, will be identified.

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(1) Motorcycle Size--Large enough to hold passenger and operator without:
   - (a) Taxing the engine.
   - (b) Crowding the operator.
   - (c) Forcing the passenger to hang over the edge of the seat.

(2) Foot Pegs--Passenger pegs are required.

   - (a) Passenger needs a firm footing to keep from falling off.
   - (b) Passenger's loss of balance could unseat the operator.

(3) Adjustments

   - (a) Tire pressure.
      - Check owner's manual for correct tire pressure with passengers.
      - Generally requires adding a few pounds.
   - (b) Mirror adjustment.
      - Check the mirrors with passenger seated.
      - Readjust mirrors as described in Lesson II-1.
   - (c) Shock absorbers.
      - Adjust to provide firm pressure.
      - Substantial mirror adjustment points to need for further adjustment of shocks.
      - Adjustment procedures appear in owner's manual (also discussed in Unit IV).
   - (d) Headlights.
      - Shouldn't require re-adjustment if shocks adjust properly.
      - If shocks cannot be adjusted, must lower headlight elevation.

(4) Protective Equipment--Passengers need the same protective and visibility enhancing gear as operators.

4.3 Passenger Instruction

Instructions to passengers should be reviewed. This may be done through role-playing, i.e., having one student instruct the other. Instructions to passengers include the following:

(1) Wait until the engine is started before mounting (unless the motorcycle has an electric starter).

(2) Sit as far forward as possible to minimize effect on motorcycle handling characteristics.

(3) Hold tightly to the operator's waist, hips, or belt.

  (a) Hold particularly tight when warned by operator.
  (b) Brace against the footpegs when the motorcycle brakes.

(4) Keep feet on footpegs.

  (a) Feet must remain on pegs during all stops.
  (b) Keeping feet on pegs avoids any chance of the motorcycle starting while the passenger's feet are still on the ground.

(5) Leans with the operator.

  (a) Some passengers may resist leaning and try to stay upright.
  (b) A tendency of the motorcycle to swing outward in a turn indicates that the passenger is not leaning.

(6) Avoid talking.

  (a) It distracts the operator's attention.
  (b) It encourages the operator to turn his head to hear or respond.

4.4 Operating With Passengers

(1) Starting

  (a) Make sure the motorcycle is in a position to be accelerated straight ahead, on the flat or downhill.
  (b) Use both feet to support the motorcycle.
  (c) Use the hand brake to keep the motorcycle from moving forward as the passenger mounts.
  (d) Ask if the passenger is ready before accelerating.
  (e) Accelerate gradually.

(2) Adjust speed.

  (a) Operate at somewhat lower speeds.
    - At corners, to lessen the lean angle.
    - On approaching bumps in order to reduce shock to passengers.
  (b) Stopping.
    - Slow more gradually.
    - Allow a greater stopping distance.

(3) Vehicle separations--Allow increased distance from other vehicles, owing to the motorcycle's lowered responsiveness.

  (a) Following distance--3-4 seconds, to allow for greater stopping distance.
  (b) Require greater gaps when merging with, crossing, or entering traffic, in order to allow for reduced acceleration.

(4) Warn passengers of:

  (a) Quick stops.
  (b) Sudden accelerations.
  (c) Sharp turns.
  (d) Bumps ahead.

(5) Stalling--If the engine stalls:
  (a) Ask passenger to lift peg and swing the leg out of the way of the kickstart lever.
  (b) Ask passenger to help support the motorcycle if necessary.
  (c) If the motorcycle won't start, ask passenger to dismount; push the motorcycle to the roadside.

5. Carrying Cargo 5 minutes

5.1 Restrictions

The instructor should emphasize that motorcycles are not designed to carry cargo; they should not be made to serve as a truck.

5.2 Distributing Load

The need for the following loading procedures should be illustrated and discussed.

(1) Keeping the load low.

  (a) Load mounted high raises the center of gravity; disturbs balance in turning.
  (b) Use saddlebags or fasten loads to the seat.
  (c) Avoid piling loads against the sissy bar.

(2) Keep loads forward.

  (a) Rear-mounted loads tend to take the weight off the front wheel.
    - Disturbs handling in turns.
    - Reduces braking efficiency.

(3) Distribute the load evenly.

  (a) Loads in each saddlebag should be approximately equal.
  (b) Uneven load may cause the motorcycle to pull to one side.

5.3 Secure the Load

Instructor will point out the need for making sure loads are properly secured.

(a) Loose items may catch in the chain.
  - Locked rear wheel.
  - Result in a fall.

(b) Best to use elastic cords or ropes in order to keep load tight.
(c) Check load whenever stopped.

5.4 Operating With Loads

The instructor need only point out the similarities between cargo and passengers with respect to:

(a) Stopping distance
(b) Accelerative capability.

6. Range Preparation 5 minutes

The instructor will review briefly the activities to be performed in the next range session:

Exercise 1 - Handling Motorcycle Problems--Practice in:
  (a) Switching the position of the fuel valve while operating the motorcycle.
  (b) Jumpstarting the engine.

Exercise 2 - Carrying Passengers--Practice in maneuvering the motorcycle while carrying a passenger.

Exercise 3 - Developing Large Lean Angles--Practice in getting the motorcycle to lean sharply, and leaning with it.

Exercise 4 - Controlling Lean Angle--Practice developing the quick lean angles needed to negotiate sharp turns.

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MOTORCYCLE SAFETY EDUCATION PROGRAM

UNIT	LESSON	SESSION	TITLE	MODE
III	1	2	Motorcycle Related Skills: Skill Development	Range

PURPOSE

The purpose of this Session is to enable students to develop the advanced skills needed to handle selected motorcycle related conditions and to develop the advanced turning skills that underlie activities to be performed in the following range session.

CONTENT

This Session consists of the following exercises:

1. Handling Motorcycle Problems
2. Carrying Passengers
3. Developing Lean Angles
4. Making Sharp Turns

In this Session, students apply procedures for handling those motorcycle-related problems that can be safely performed on the range. They also practice developing the large motorcycle lean angles that will be required for activities performed in Lesson 2.

To make most efficient use of available facilities, the first three exercises can be performed simultaneously, four students being assigned to each exercise. One instructor would be positioned at each end of the range to supervise activities in that area. Students would rotate through the exercise while the instructors remain. All students would then perform the last exercise at the same time.

MATERIALS

See Unit Specifications.

EQUIPMENT

Motorcycles--In addition to meeting Course specifications, two motorcycles must be equipped for passenger carrying including:

- Passenger pegs.
- A seat capable of accommodating the passenger and operator.

METHODS

1. Handling Motorcycle Problems

1.1 Switching Fuel Valve 5 minutes

(1) Purpose--To enable students to identify symptoms of fuel loss and to manipulate the fuel valve without disrupting control of the motorcycle. (Note: Since the various switch positions vary from one motorcycle to another, students need not acquire skill in finding specific settings on training motorcycles).

(2) Range Layout--This exercise may be performed in any area where students will not disrupt, or be disrupted by, students performing other exercises. In a range laid out according to Course specifications, students may operate at one end of the range. Refer to the illustrative diagram "Switching Fuel Valve and Jumpstarting."

(3) Exercise Procedure--The following activities will be performed in the sequence indicated:

(a) Students may be positioned side by side, at one end of the perimeter path. While stationary, they will practice locating and switching positions of the fuel valve without looking.

(b) Next, students will ride the perimeter road while they practice switching positions of the fuel valve, as follows:
- Reach down without looking and switch the fuel valve position.
- Return the hand to the handgrip.
- Reach down without looking and return the switch to its original position.
- Keep repeating the above activities while maintaining a center lane position.

(c) After one circuit, students will:
- Stop and turn the fuel valve to the "off" position.
- Start the motorcycle and continue riding around the exercise path.
- Switch the fuel valve to the "reserve" position as soon as the engine dies. (It should only require approximately three minutes for the engine to run out of fuel. However, some motorcycles may run a good deal longer.)

(4) Operating Procedures--The above exercise will be performed using the following procedures:

(a) Keep head up and eyes focused on the road ahead at all times.
(b) Locate fuel valve, change position, and return the hands to the handgrip as quickly as possible.
(c) Maintain a stable lane position.

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(5) Instruction Points--The instructor will observe for the following:

(a) Looking down at fuel valve.
(b) Excessive fumbling with the fuel valve.
(c) Weaving back and forth while switching fuel valve position.

(6) Method--No instructor demonstration is needed. Students may proceed directly to practice the activities described.

1.2 Push Starting 5 minutes

(1) Purpose--The purpose of this exercise is to prepare students for the jumpstarting exercise that follows.

(2) Range Layout--The same as 1.1.

(3) Exercise Procedure--This exercise will consist of the following activities:

(a) Students will assemble at the beginning of the straightaway leading away from the area where Exercise 2 is being conducted.
(b) Students will be divided into pairs. One student in each pair pushes the motorcycle while the other rides it.
(c) At the instructor's signal, the first pair engages in a "Buddy Push" as described in Session I-1-2.
(d) As the "pusher" lets go, the rider will start the motorcycle and proceed around the perimeter road and cross street back to the starting point.
(e) As soon as the first rider has started the engine, the second pair of students will carry out the same procedure.
(f) Students switch position in pairs and repeat the exercise.

(4) Operating Procedures--The motorcycle will be started using the following procedure:

(a) Before the motorcycle is pushed:
- Turn ignition on.
- Make sure fuel valve and engine cut-off are in the operating position.
- Squeeze the clutch.
- Place the motorcycle in second gear.

(b) When the "pusher" has let go:
- Release the clutch gradually.
- Open the throttle as soon as the engine starts.

(5) Instruction Points--The instructor will observe for the following:

- (a) Failure to place the ignition and cut-off switch in the correct position.
- (b) Attempting to start in the wrong gear.
- (c) Releasing the clutch too slowly or too quickly.
- (d) Incorrect throttle position causing the motorcycle to slow down abruptly or lurch forward when the engine starts.

(6) Method--

- (a) Since this exercise is relatively simple, no demonstration should be required.
- (b) Operators should be cautioned not to release the clutch until the pusher has let go.
- (c) Students should be apprised of errors upon returning to the starting point.
- (d) Any student who fails to start the engine or makes a serious error needs to be provided with a second trial.

1.3 Jump Starting 5 minutes

(1) Purpose--The purpose of this exercise is to enable students to develop proficiency in jumpstarting the engine.

(2) Range Layout--The same as 1.1.

(3) Exercise Procedure--This exercise will consist of the following activities:

- (a) Students assigned individual motorcycles will be positioned at the starting point identified in 1.2.
- (b) At the instructor's signal, the first student will push the motorcycle along the straightaway and jump start it.
- (c) Upon starting the engine, the student will continue around the perimeter road and cross street to the starting point.
- (d) If the engine fails to start, the student will push the motorcycle back to the starting point, keeping well to the side.
- (e) The next students will begin as soon as the first student has started the engine or moved off to the side.
- (f) The process will continue until all four students have had a trial.
- (g) Students who fail to start the first time will then be given a second trial.

(4) Operating Procedures--This exercise will be performed using the following procedure:

- (a) Turn ignition on.
- (b) Make sure fuel valve and engine cut-off are in operating position.
- (c) Squeeze clutch.
- (d) Place the motorcycle in second gear.
- (e) Push the motorcycle until it attains maximum speed.
- (f) Mount the motorcycle quickly.
- (g) Release the clutch.
- (h) Open the throttle as soon as the engine starts.
- (i) Try starting in first gear if the motorcycle fails to start in second.

(5) Instruction Points--Students will be observed for the following:

- (a) Failure to gain sufficient speed before mounting the motorcycle.
- (b) Instability and erratic path while mounting the motorcycle.
- (c) Releasing the clutch after the motorcycle slows down.
- (d) Positioning the throttle so as to cause the motorcycle to drag or lurch forward.

(6) Method--

- (a) Students who lack the strength and agility needed to carry out the exercise safely should not be permitted to attempt it.
- (b) Students who successfully start the engine should await the next exercise while the instructor assists anyone who is having difficulty.
- (c) Since the engines are warm, they should start easily. If continued trouble is experienced, the student should switch to another motorcycle.

2. Carrying Passengers 15 minutes

(1) Purpose--The purpose of this exercise is to provide students an opportunity to experience operation of the motorcycle while carrying a passenger and allow them to apply operating procedures appropriate to passenger carrying.

(2) Range Layout--Students may operate in any area in which they can maintain a speed of 10-20 mph without disrupting, or being disrupted by, students performing other exercises. In a range laid out according to Course specifications, students may use one-half of the range. Refer to the illustrative diagram "Carrying Passengers."

(3) Exercise Procedure--The exercise will consist of the following activities:

(a) Students will be divided into pairs, one student serving as operator and the other as passenger. The students in each pair should be of approximately equal weight.
(b) The operator will instruct the passenger on proper behavior. The passenger will point out any errors or omissions in instructions.
(c) The student pairs will start the motorcycle and proceed around the layout as follows:
  - Maintain a three-second separation between motorcycles.
  - Do not exceed 20 mph.
  - Bring the motorcycle to a full stop and start again on at least two occasions.
  - Perform occasional lane changes where it is safe to do so.
  - At the instructor's signal, perform a U-turn at the end of the straightaway and reverse the direction of travel.
(d) After the first few circuits, the passenger may make the following "errors" in order that the operator may experience their effects:
  - Movement from side to side.
  - Failure to lean in a turn.
(e) At the instructor's signal (after approximately 10 minutes), the students will stop, switch positions and repeat the exercise.

(4) Operating Procedures--The exercise will be carried out using the following procedure:

(a) The operator will instruct the passenger to:
  - Mount the motorcycle after the engine is started.
  - Sit as far forward as possible.
  - Hold tightly to the operator's waist or hips.
  - Keep both feet on the pegs at all times, even when the motorcycle is stopped.
  - Stay directly behind the operator, leaning as the operator leans.
  - Avoid any unnecessary motion or talk.

(b) The passenger will perform as instructed except for the provision noted in Exercise Procedure (d) above.

(c) The operator will perform the following:
- Accelerate gradually.
- Slow down gradually.
- Slow down for corners.
- Warn passenger of any speed or direction changes.

(5) Instruction Points--The instructor will observe for the following:

(a) Rapid or jerky speed or direction changes.
(b) Passenger using the seat, luggage rack, or operator shoulders for support.
(c) Operator turning head to give instruction or listen to passenger.
(d) Passenger consistently failing to lean with the operator.

(6) Method--No instructor demonstration should be required. Given exercise instructions, students may proceed on their own. The instructor will intercede in order to:

(a) Correct any dangerous conditions including:
- The insufficient following distance between pairs.
- Conflict with students in other exercises.
- Unsafe passenger activities.

(b) Give exercise directions, including:
- U-turn signal.
- Signal to switch pairs.

(c) Apprise students of errors when they stop to switch positions and at the end of the exercise.

3. Developing Lean Angles 15 minutes

(1) Purpose--The purpose of this exercise is to enable students to develop and maintain a large, stable lean angle.

(2) Range Layout--Through the use of painted markings or temporary markers, two sets of concentric circles, having the following characteristics, will be prepared:

(a) Radii ranging from 20 feet to 30 feet.
(b) Path widths of approximately 3 feet.
(c) Separation from adjacent traffic by at least 10 feet. Refer to the illustrative diagram, "Developing Lean Angles."

(3) Exercise Procedure--This exercise consists of the following activities:

(a) Two students are assigned to each set of circles.
(b) One student in each pair is assigned to the inside circle and the other to the outside circle.
(c) Students must attempt to remain within their assigned circle; each time they touch or cross a line should be viewed as an "error."
(d) Speed will be gradually increased to the maximum a student can attain and still remain within the prescribed path.
(e) The instructor will signal students to change direction and to switch circles every few minutes. Each student should operate on each path in each direction.

(4) Operating Procedures--No new operating procedures are involved. This exercise involves further development of coordinations involved in turning so as to be able to maintain a large stable lean angle.

(5) Instruction Points--The instructor will observe for the following:

(a) Failure to attain a lean angle of at least 30° from the vertical.
(b) Failure to attain a body lean angle at least 2/3 that of the motorcycle.
(c) Frequent throttle and steering reversals and brake applications.
(d) Failure to remain within the 3-foot path.

(6) Method--Students who are having difficulty relative to the instruction points should be pulled aside for individual coaching as follows:

(a) Insufficient motorcycle lean--Insufficient lean is a result of insufficient speed. Many students are apprehensive about developing large lean angles and must work up to it slowly. Students should be instructed to keep increasing speed gradually until they receive a signal from the instructor.
(b) Insufficient body lean--Anxiety about leaning the motorcycle may result in an effort to compensate by keeping the body upright. Students should be encouraged to deliberately "lean into" the turn so that they are supporting themselves by their arms and knees.

(c) **Frequent throttle reversals and brake applications**--This response pattern generally signals a preoccupation with other elements of the turn. Students should be encouraged to concentrate on finding a throttle position that provides a stable turning angle and to maintain it with as few corrections as possible.

(d) **Failure to remain on path**--This often is a result of a student's effort to "steer between the lines." Students should be encouraged to keep their eyes up and to steer along a path ahead.

4. Making Sharp Turns 15 minutes

(1) **Purpose**--The purpose of this exercise is to enable students to lean the motorcycle at the appropriate angle to negotiate a turn at maximum safe speed.

(2) **Range Layout**--Using markers or painted lines, the range should be configured so as to provide the following:

(a) A pair of 180° turns, of varying radii, at each end of the range.
(b) Four 90° turns, of varying radii, at the corners of the range.

Refer to the illustrative diagram "Making Sharp Turns."

(3) **Exercise Procedure**--The exercise will consist of the following activities:

(a) Students will be divided into two groups of six students each.
(b) One group will be assigned to the inside of the range area and operate between the 180° circles as follows:
- Start at one end of the range.
- Ride toward the circle at the far end of the range.
- Enter the path indicated by the instructor.
- Negotiate the curve as fast as possible while still remaining within the 3-foot path.
- Ride to the circle at the far end of the range and negotiate the corresponding path in the same manner.

After each circuit, the instructor will change the path students are to enter so as to force a judgment of maximum turning speed.

(c) The other group of students will be assigned to the perimeter of the range where they will operate under the supervision of the other instructor. They will perform as follows:

- Ride the inside lane of the range.
- Negotiate each 90° curve at the maximum speed while still remaining within the 3-foot path.

(d) The instructors will watch students so as to maintain at least a 2-second following distance between students.

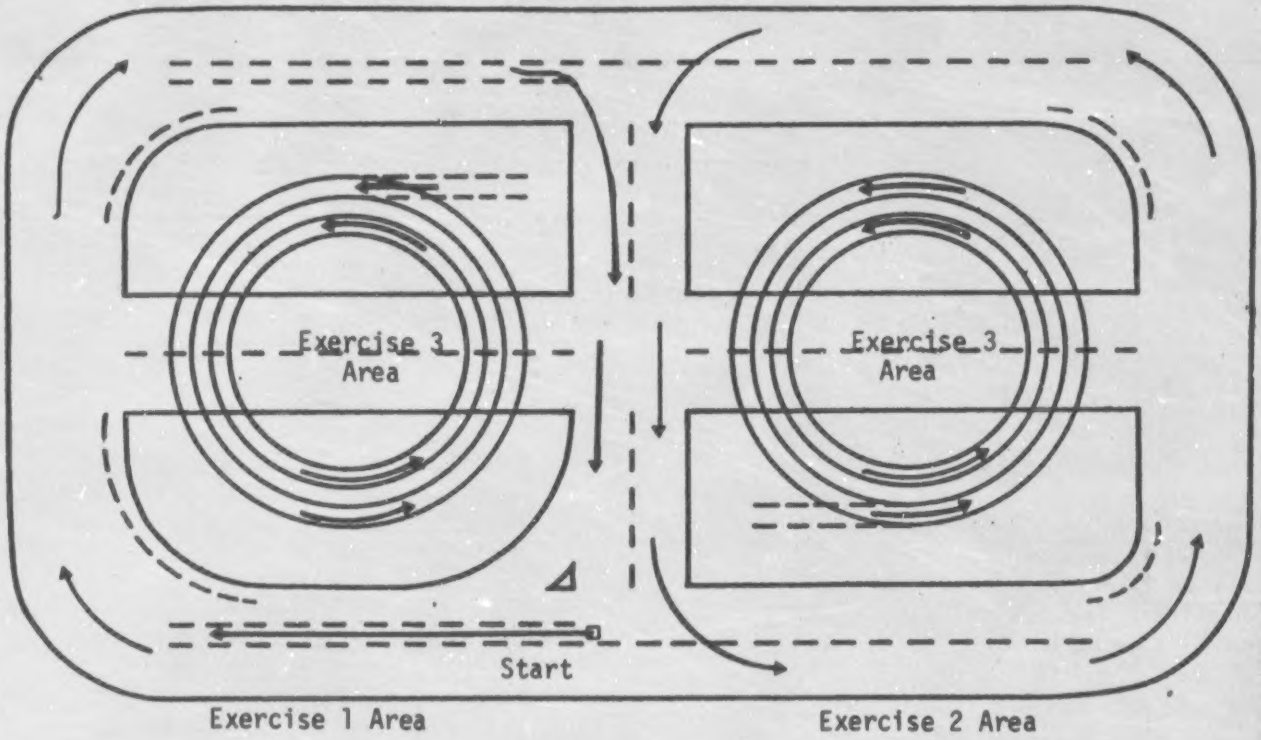
(e) After a few minutes, the instructors will reverse the direction of travel. This should be done at the same time for both groups so that no students are travelling in opposite directions.

(f) After approximately 7 minutes, the two groups should switch paths.

EXERCISE 1 - SWITCHING FUEL VALVE AND JUMPSTARTING

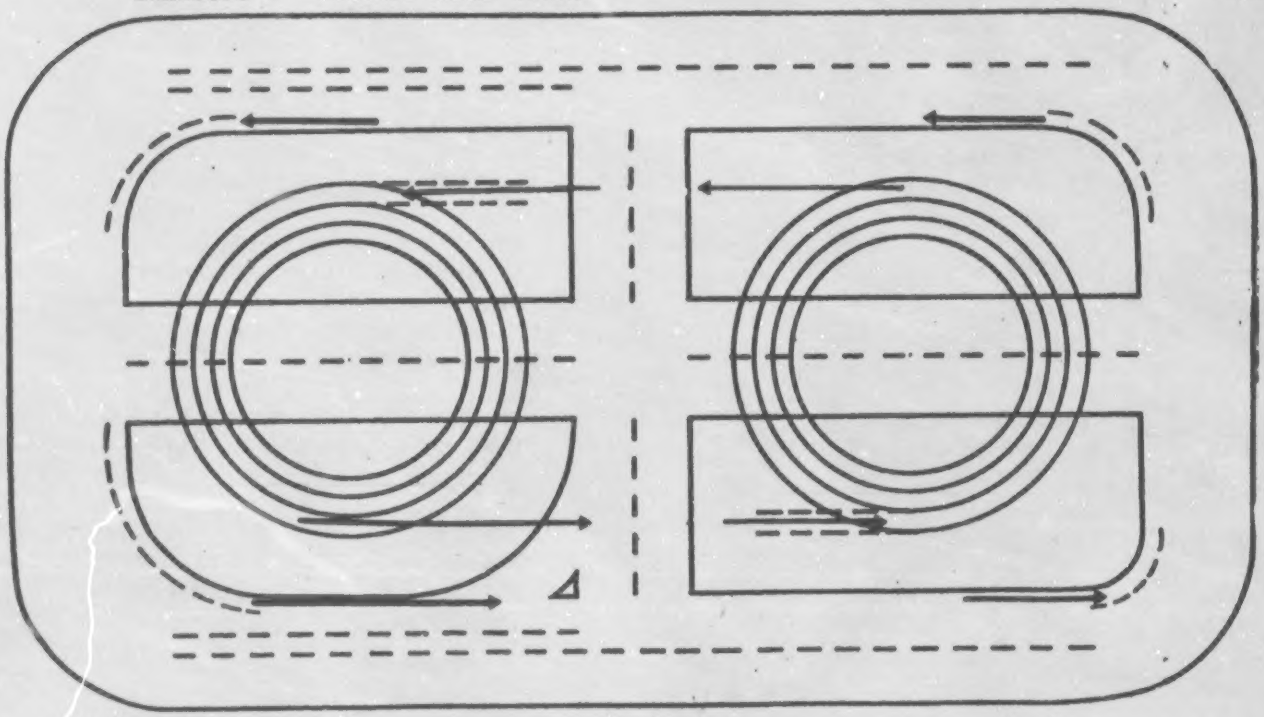
EXERCISE 2 - CARRYING PASSENGERS

EXERCISE 3 - DEVELOPING LEAN ANGLES



Exercise 3 Area
Exercise 3 Area
Start
Exercise 1 Area
Exercise 2 Area

EXERCISE 4 - MAKING SHARP TURNS



MOTORCYCLE SAFETY EDUCATION PROGRAM

UNIT	LESSON	TITLE
III	2	Roadway-Traffic Related Skills

PURPOSE

The purpose of this lesson is to enable students to acquire the advanced skills required in handling roadway and traffic related conditions.

OBJECTIVES

Performance Objectives	Knowledge and Skill Objectives
Handling obstacles--the student must be able to surmount obstacles smaller than the motorcycle's ground clearance, including equipment, broken pavement, or debris.	The student must know the proper angle at which to approach obstacles.
	The student must be able to coordinate throttle application and weight distribution to lighten the front end when surmounting irregularities and obstacles.
	The student must know the power and gear-to-weight relationships of the motorcycle for surmounting..
Quick stops--the student must be able to bring the motorcycle to a stop in the shortest possible distance both in a straight line and in a turn.	The student must be able to apply the front and rear brake to the fullest extent without locking the front wheel.
	The student must know the effect of different tire characteristics, including tread type, on handling of the motorcycle in a quick stop.
Quick turn--the student must be able to circumvent an obstacle by making a quick turn.	The student must be able to perform quick changes in direction by countersteering.
Collision avoidance--the student must be able to select an appropriate maneuver quickly when confronted by an impending collision.	The student must know the hazards associated with, and the desirability of avoiding, emergency lane changes.

Performance Objectives

Windbreaks--the student must control the motorcycle in response to changes in wind conditions when passing roadside structures and contours that expose, channel or interrupt crosswinds.

Flying objects--the student must maintain control of the motorcycle when struck by flying objects from the road surface, or passing cars, or when struck by insects.

Animals--Students must be able to select the correct maneuver when confronted by animals in the path of the motorcycle or when being charged by a dog.

Knowledge and Skill Objectives

The student must be able to identify conditions that will influence crosswinds. The student must be able to respond to changes in the lateral force created by wind conditions.

MOTORCYCLE SAFETY EDUCATION PROGRAM

UNIT	LESSON	SESSION	TITLE	MODE
III	2	1	Roadway-Traffic Related Skills: Procedures	Classroom

PURPOSE

The purpose of this Session is to communicate procedures for dealing with roadway and traffic situations requiring advanced skill.

CONTENT

This Session consists of the following topics:

1. Lesson Overview
2. Skid Control
3. Surmounting Obstacles
4. Quick Stops
5. Quick Turns
6. Other Hazards
7. Range Preparation

MATERIALS

Student Materials

See Unit Specifications.

Teacher Materials

See Unit Specifications.

Instructional Aids

The requirements for visual aids are identified in the specification of METHODS below. The majority of these requirements are concerned with representations of:

(a) Roadway and traffic conditions requiring a skilled response.
(b) Operator and vehicle responses to the various conditions.

EQUIPMENT

See Course Specifications.

FACILITIES

See Course Specifications

METHODS

1. Lesson Overview 2 minutes

A brief overview of the Lesson will be provided.

1.1 Content

Concerned with emergencies arising out of the roadway traffic environment.

1.2 Topics

This Session will include the following topics:

(1) Handling extremely slippery surfaces.
(2) Surmounting obstacles.
(3) Making quick stops.
(4) Making quick turns.
(5) Miscellaneous hazards.

2. Skid Control 10 minutes

2.1 Operating On Extremely Slippery Surfaces

(1) Avoid if possible:

    (a) Stay off snow-packed or icy streets if possible.
    (b) Take an alternate route if possible.
    (c) Operate on pavement cleared by vehicles.
    (d) Operate in deep snow rather than hard-packed snow or ice.

(2) When necessary to negotiate an extremely slippery surface:

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(a) Operate at very slow speed.
(b) Use feet as outriggers.
(c) Accelerate gradually.
(d) Shift smoothly.
(e) Avoid braking.

2.2 Negotiating Slippery Spots

(1) Examples of very slippery spots

(a) Ice, oil, wet leaves.
(b) Wet lane markings, metal or wood
(c) Loose gravel

(2) Crossing slippery spots

(a) Maintain a straight course in order to keep motorcycle upright.
(b) Avoid any attempt to brake or turn.
(c) Slow or turn upon reaching a firm surface.

2.3 Skid Recovery

The instructor will illustrate the nature of a rear wheel skid and methods of recovery.

(1) Causes of rear wheel skid.

(a) Slippery surface.
(b) Locked rear wheel

(2) Nature of skid

(a) Rear wheel lacks friction.
(b) Rear wheel tends to move faster than front wheel.
  - Attempts to catch up and pass the front wheel.
  - Accentuated if the motorcycle is turning.
(c) Causes the frame of the motorcycle to revolve around the steering assembly.
(d) Articulation of frame and steering assembly causes the frame to lean as it rotates about the steering assembly.
(e) Excessive lean will result in loss of balance and a fall.

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(3) Use of brakes

(a) Out-of-line skid
- If the rear end starts to swing out, the brake must be released immediately.
- Release of brake will cause the rear wheel to rotate, restoring traction.
- As traction is restored, the rear wheel will stop sideways, and begin to follow the motorcycle.
- The motorcycle will return to a straight up position.

(b) Straight line skid
- If the motorcycle can be maintained on a straight course, there is little danger of falling.
- In an emergency, rear brake pressure can be maintained to minimize stopping distance.

(4) Steering

(a) Since the frame revolves around the steering assembly, the front wheel remains oriented along the vehicle's path of travel and it is not necessary to "steer into the skid" as in an automobile.
(b) Minor steering corrections are needed to maintain balance.
(c) Needed steering corrections are general balance, maintaining reactions; will occur automatically.

NOTE: No mention is made of a front wheel skid, or a "high side" produced by a rear wheel skid. The chances of recovering from either are too small and are too little influenced by instruction to warrant inclusion in this session. Braking techniques described are intended to minimize the likelihood that either phenomenon will occur.

3. Surmounting Obstacles 10 minutes

Using pictorial visuals, the instructor will illustrate the various types of obstacles and the procedure involved in surmounting them safely.

3.1 Surmountable Obstacles

(1) In general, the motorcycle is capable of surmounting anything that does not exceed its ground clearance.

(a) Best to circumvent obstacles if possible.
(b) Surmounting obstacles should be viewed as an emergency procedure in the highway environment.

- (2) Objects lying in the road.
  - (a) May appear too suddenly to be circumvented.
    - May fall off vehicle ahead.
    - May appear from beneath the vehicle ahead.
  - (b) Examples: Muffler, tailpipe, tire section, lumber.
- (3) Curb--It may be necessary to climb a curb in order to leave the road in an emergency.
- (4) Surface conditions.
  - (a) Large chuckholes, deep ruts.
  - (b) Rails raised above the surface.

3.2 Approaching Obstacles

- (1) Reduce speed.
  - (a) Reducing speed as much as possible upon approach:
    - Reduces impact.
    - Allows more time to maneuver.
  - (b) Brake gently
    - Locking the rear wheel may result in a skid.
    - Skid would interfere with steering adjustments needed to approach the obstacle at the correct angle.
  - (c) Downshift
    - Helps to reduce speed.
    - Puts motorcycle in a lower gear for quick acceleration that will be needed.
- (2) Adjust approach angle.
  - (a) Approach any obstacle as close to a head-on as possible.
  - (b) The larger the obstacle, the closer to 90° must be the approach angle.
  - (c) Any obstacle over a couple of inches high should be approached at greater than a 45° angle.
  - (d) Straighten path before reaching obstacle.
    - Keeps the motorcycle upright.
    - Upward impact could cause a fall if the motorcycle were leaned.

3.3 Climbing Over Obstacles

Motorcycles will, as a function of their power-to-weigh ratio, differ in their ability to lift the front end in order to climb over obstacles. Students should be advised to avoid attempting to climb obstacles on heavy street machines unless necessary. However, when an obstacle must be surmounted, the procedure is the same for all machines.

Upon reaching an obstacle, the operator must simultaneously perform the following:

(1) Rise slightly on footpegs.

  (a) Allows knees to absorb shock, reducing the chance of being unseated.
  (b) Allows weight to be shifted more easily.
  (c) Important to keep knees flexed.

(2) Lighten the front wheel.

  (a) Advantage--reduces impact.
    - Helps operator to maintain control.
    - Minimizes chance of damage to tire or rim.
  (b) Shift weight back.
    - Done while rising on pegs.
    - Gives a feeling of pulling back on the handlebars.
  (c) Open throttle quickly.
    - Sudden acceleration produces a rearward weight shift.

3.4 After Climbing Obstacle

(1) Lower front wheel.

  (a) Need to get the front wheel on the ground as quickly as possible.
    - Need front wheel on the ground for steering.
    - Particularly important if the motorcycle must be turned quickly.
  (b) Close the throttle.
  (c) Allow weight to come forward.

(2) Adjust speed and direction as necessary.

(3) Pull off and check the front wheel for damage.

4. Quick Stops 10 minutes

4.1 Use of Both Brakes

Using visual aids, instructor will illustrate and discuss the need for using the front as well as the rear brake in stopping the motorcycle quickly. The visuals should show the affect of front brake use on stopping distance.

(1) Braking power of the front brake.

  (a) Forward weight shift occurs in stopping and braking.
  (b) Weight shift gives the front brake about 3/4 of the braking power.
  (c) Use of front brake reduces stopping distance by one-third over use of rear brake alone.

(2) Danger of using front brake.

  (a) Locked front wheel will generally result in a fall.
    - Causes loss of steering.
    - Without steering, balance cannot be maintained.
    - A fall would generally occur too quickly to allow control to be regained.
  (b) Danger of a serious fall is rather small.
    - Proper application will prevent front wheel lockup.
    - Front wheel rarely locks unless the motorcycle is going very slowly (the torque at higher speed resists lock).
  (c) In an emergency, it is better to accept the small danger of a fall than to suffer a collision.

4.2 Quick Stop Procedure

(1) Apply front brake immediately.
NOTE: Some students may have read that the rear brake should be applied first. There is no basis for such a procedure. The sooner the front brake is applied, the quicker the motorcycle will stop.

(2) Front brake application.

  (a) Close throttle and apply front brake gradually (practice first with the motorcycle stationary).
  (b) Practice will reveal how much brake pressure can be safely applied.
  (c) Ease up just before the motorcycle stops in order to prevent wheel lockup.

(3) Rear brake application.

  (a) Apply rear brake firmly.
  (b) Locking the rear wheel.
    - Yields the shortest stopping distance.
    - Makes steering somewhat harder to control (although not anywhere as difficult as an automobile).
    - Probably best not to lock rear wheel deliberately.
  (c) If rear wheel begins to slide, release brake quickly.

4.3 Stopping in a Turn

(1) Front brake.

  (a) Danger of fall is no greater than straight line braking if surface is good and brakes are properly applied.

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(b) Apply front brake the same as in straightline stopping.

(2) Rear brake.

(a) Locked rear wheel may result in outward slide.
(b) Should avoid locking the rear wheel when stopping in a turn.

5. Quick Turns 15 minutes

5.1 Situations Requiring a Quick Turn

Instructor will briefly describe or illustrate situations requiring a quick turn.

(1) Objects in roadway.

(a) Better to steer around obstacles than to ride over them.
(b) Some obstacles are too large to surmount.

(2) Car ahead stopping unexpectedly.

(3) Pedestrian or car entering from the side.

5.2 Principle of Counter-Steering

Using appropriate visuals, the instructor will illustrate and describe the process of counter-steering. Visuals may consist of diagrams, a series of static pictorials, or a dynamic presentation employing stop action.

(1) Need for counter-steering.

(a) To make a quick turn, the motorcycle must be leaned quickly.
(b) The motorcycle's own motion provides the strongest available force.
(c) "Counter-steering" is a technique for using the motorcycle's motion to lean.

(2) Counter-steering technique.

(a) Apply slight pressure to the inside of handgrip in the same direction turn is to be made.
(b) Pressure deflects front wheel away from the direction of intended turn.
(c) Causes motorcycle's wheels to move away from the direction of the intended turn.

(d) The motorcycle's frame and operator continue straight ahead.
(e) The result of (c) and (d) is a lean in the direction of intended turn.

(3) Counter-steering is the quickest way to get the motorcycle to lean at all but very slow speeds.

5.3 Turn Procedure

The instructor will illustrate and describe the procedure for making a quick turn.

(1) Turning.

(a) Counter-steer, as described, causes motorcycle to lean in the desired direction.
(b) Operator will automatically turn in the desired direction in order to maintain balance.
(c) The result is a quick turn away from any obstacle.

(2) Straightening up.

(a) Continued sharp turning brings the wheels back beneath the motorcycle.
(b) This causes the motorcycle to straighten up.

(3) Returning to the original path.

(a) If turn is made sharp enough, the motorcycle will not only straighten up, but will lean in the opposite direction from the original turn.
(b) To maintain balance, the operator will turn in the opposite direction from the initial turn.
(c) This will cause the motorcycle to return to its original path.
(d) The entire maneuver will be a continuous S-shaped turn around an obstacle.

(4) Students may demonstrate the counter-steer to themselves by applying pressure to the inside of one handlebar. The result will be a quick turn in the direction the pressure is applied.

Note: Some students may have been told to "press down" on the handlebar. This advice reflects an impression gained from the fact that applying pressure to the inside of a handlebar causes the handlebar to dip as the motorcycle leans. Actually, pressing down on the handlebar accomplishes nothing.

5.4 Braking in a Quick Turn

(1) Advantage of rear brake application--slowing the motorcycle allows more time to complete a turn.

(2) Rear brake should be applied lightly.

  (a) Excessive brake application in a sharp turn will produce a skid.
  (b) In a skid, the rear wheel will tend to slide toward the obstacle.
  (c) An effort to maintain balance will result in a turn back toward the obstacle.
  (d) It is imperative that a rear wheel skid be avoided.

(3) Front brake--The steering activity involved in a quick turn generally precludes the use of the front brake.

5.5 Remaining in Lane

The instructor should emphasize the importance of avoiding a lane change when steering around an obstacle.

(1) Danger of lane change.

  (a) Not enough time to make a head check.
  (b) Risk of being hit by another car is great.

(2) Ability to stay in lane.

  (a) Because of the motorcycle's size, most obstacles can be circumvented without changing lanes.
  (b) Even if the obstacle is a car, the motorcycle can pull alongside.

6. Other Hazards

10 minutes

6.1 Wind Gusts and Air Turbulence

The instructor will illustrate and describe the effects of wind gusts and air turbulence upon the operation of the motorcycle and the means of countering these effects.

(1) Source of wind gusts and turbulence.

  (a) Trucks passing.
  (b) Exposed areas on windy days.

(2) Effects on operation.

(a) Wind gusts and turbulence from the side tend to lean the motorcycle.
(b) The effect upon the operator is one of being blown laterally.
(c) A strong gust can produce lateral motion as great as the width of a lane.

(3) Countering the effect of wind gusts and turbulence.

(a) Maintain a center lane position; this allows more room for the motorcycle to move laterally in an effort to offset:
- A lateral move downwind at the onset of a gust.
- A lateral move upwind as the gust ceases.

(b) Reduce speed.
- The slower the motorcycle is going, the less it will move laterally.
- Wind gusts and turbulence may result in a steering wobble at higher speeds.

(c) Watch for signs of potential turbulence.
- Oncoming trucks--they both create turbulence and interrupt crosswinds.
- Indications of crosswind--dust, trees, leaning grass.
- Exposed areas--bridges over ravines; spaces between buildings and wooded areas.

(d) Be prepared to respond quickly; the quicker the response, the less lateral motion there will be.
(e) Lean into the wind (this tends to be an automatic reaction).

6.2 Animals

(1) Small animals in the motorcycle's path.

(a) Attempt to steer around the animal to prevent injury to both the operator and the animal.
(b) Stay in lane if other vehicle's are around; it is better to risk striking a small animal than risk being hit by another vehicle.

(2) Being pursued by dogs.

(a) The noise of motorcycles tends to attract dogs.
(b) Proper procedure:
- Downshift and approach the dog slowly.
- As the dog draws alongside, accelerate suddenly.
- The quick distance separation will cause most dogs to give up.

(c) Don't kick at the dog.
    - Upsets balance.
    - May result in a loss of steering control.

7. Range Preparation 3 minutes

Review briefly the activities that are to take place in the next two range sessions:

(1) Quickstopping, both in a straight line and a curve.

(2) Obstacle avoidance.

(3) Obstacle surmounting.

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MOTORCYCLE SAFETY EDUCATION PROGRAM

UNIT	LESSON	SESSION	TITLE	MODE
III	2	2	Roadway-Traffic Related Skills: Collision Avoidance	Range

PURPOSE

The purpose of this session is to enable students to develop the braking and turning skills needed to enable students to avoid collisions.

CONTENT

This Session consists of the following exercises:

1. Using the Front Brake
2. Controlling Locked Rear Wheel
3. Maximum Braking--Straight
4. Maximum Braking--Curve
5. Countersteering
6. Quick Turn
7. Obstacle Avoidance

The first four exercises are concerned with quick stopping. The first two exercises are intermediate steps in developing skills needed for Exercises 3 and 4.

The last three exercises are concerned with developing the ability to steer quickly around an obstacle. Exercises 5 and 6 help develop skills required for Exercise 7.

MATERIALS

See Unit Specifications.

EQUIPMENT

See Unit Specifications.

FACILITIES

Requirements for facilities are those identified in Course Specifications. However, particular effort must be made to assure that the range surface in areas where exercises take place is absolutely dry and free of dirt or debris.

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METHODS

1. Using the Front Brake 10 minutes

(1) Purpose--The purpose of this exercise is to allow students to demonstrate the capability of the motorcycle's front brake and to enable them to develop skill in regulating front brake pressure.

(2) Range Layout--The exercise is conducted on two straightaways. In a range configured according to the basic range diagram, the straightaways could be marked on the perimeter road, and the center road used to return to the starting area. Two clearly marked paths should be provided for students to guide them while approaching the stopping area. The use of two paths allows successive students to alternate paths. This approach (a) expedites progress by allowing one student to start down the path as soon as the preceding student has stopped, and (b) leaves the center path free of tire marks for Exercise 3.

A braking point should be indicated by a clearly observable marker. The marker should be placed approximately 60 feet from the end of the straightaway to allow ample stopping distance area.

Refer to the illustrative diagram "Using the Front Brake."

(3) Exercise Procedure--This exercise will consist of the following activities:

(a) An instructor and six students are assigned to each of the two straightaways (braking paths).

(b) Students ride the braking path towards the braking marker where the instructor is located.

(c) Speed should be stabilized before reaching the braking marker. Initial trials are run at 15 mph and then speed is increased to 20 mph.

(d) Upon reaching the marker, students stop by using the front brake alone.

(e) During intial trials, less than full brake pressure is applied; and, as trials are repeated, students continue to regulate brake pressure to obtain increased braking efficiency.

(f) As soon as a student has completed a stop, the next student will begin riding down the braking path.

(g) Instructors are located near the braking markers between the pair of braking paths.

(4) Operating Procedure--Students perform the exercise using the following procedures:

(a) Close throttle while braking.

(b) Apply front brake pressure to come to a quick stop.

(c) Pull in clutch before engine stalls.

(d) Ease up on brake just as motorcycle comes to a stop.

(5) Instruction Points--Students will be observed for the following:

(a) "Grabbing" at the front brake rather than squeezing it.

(b) Insufficient brake pressure is indicated by stopping distance or relative lack of forward pitch.

(c) Stalling or engine revving.

(d) Standing on footpegs.

(e) Looking at braking hand.

(6) Method--The instructor provides an explanation of the exercise purpose, operating speeds, and general procedures. The explanation is followed by an instructor demonstration of the exercise at a speed of 20 mph. Student practice follows the demonstration. Individual assistance is provided as necessary off to the side of the braking path.

2. Controlling Locked Rear Wheel 10 minutes

(1) Purpose--The purpose of this exercise is to provide students an opportunity to experience a locked rear wheel skid and to develop skill in controlling direction and balance with a locked rear wheel.

(2) Range Layout--The exercise area is the same as for Exercise 1.

(3) Exercise Procedure--The exercise procedures are similar to Exercise 1 except that only the rear brake is used. Students apply the rear brake upon reaching the marker with sufficient pressure to lock the rear wheel. Students will maintain brake pressure until coming to a complete stop.

(4) Operating Procedure--Students will perform the exercise using the following procedures:

(a) Apply pressure to only the rear brake.

(b) Lock the rear wheel and keep locked until stopped.

(c) Pull in clutch and close throttle while braking.

(d) Keep eyes up.

(5) Instruction Points--

(a) Inadequate brake pressure resulting in a lack of skidding.

(b) Coming off the brake as soon as skid begins (where not required to prevent a loss of balance).

(c) Rear wheel sliding out of line.

(d) Inadvertent use of front brake.

(e) Engine stalling or revving.

(6) Method--The instructor needs only to explain procedures and to demonstrate the exercise at 20 mph after which student practice may begin.

3. Maximum Braking--Straight 10 minutes

(1) Purpose--The purpose of this exercise is to enable students to develop skills needed to bring the motorcycle to a safe stop in the shortest possible distance.

(2) Range Layout--The same range layout as for Exercises 1 and 2 is used, except that the exercise must take place along the center path. The instructor must be provided a reference point about 40 feet from the braking marker in order to assess stopping distance at 20 mph.

(3) Exercise Procedures--Exercise procedures are the same as for Exercise 1, except that students apply both brakes to stop safely over the shortest possible distance.

(4) Operating Procedure--Students will employ the following procedures simultaneously.

- (a) Apply pressure to both brakes at the same time.
- (b) Lock the rear wheel.
- (c) Pull in clutch and close throttle.

(5) Instruction Points--Students will be observed for the following:

- (a) Insufficient front brake pressure (watch front fork).
- (b) Lack of sufficient pressure to rear brake (observe for skid).
- (c) Standing up.
- (d) Insufficient speed.
- (e) Stalling or revving the engine.

(6) Method--The instructor needs to explain the exercise procedure and to provide one demonstration at 20 mph. Student practice may begin following the demonstration.

4. Maximum Braking--Curve 5 minutes

(1) Purpose--The purpose of this exercise is to enable students to stop the motorcycle in the shortest possible distance while turning and to demonstrate to the student that both brakes can be used safely while stopping in a turn if proper techniques are employed.

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(2) Range Layout--The range layout should provide 90 degree and 180 degree curves, each having a path width of approximately three feet. In a range configured according to the basic range diagram provided in the Course Specifications, the varying radius curves at the four corners of the range would provide the 90 degree turns, while the two interior circles would provide the 180 degree curves.

Refer to the illustrative diagram "Maximum Braking--Curve."

(3) Exercise Procedures--The exercise will consist of the following activities:

(a) Six students are assigned to ride on the perimeter road and six are assigned to the path between the two circles. One instructor works with each group of six students. Students are rotated from the perimeter road to the oval and vice-versa when the exercise is appropriately one-half over.

(b) Both groups of students ride at a speed of 15 mph and stop quickly upon reaching the braking marker.

(c) The motorcycle must be kept within the three foot path while stopping.

(4) Operating Procedure--The exercise will be carried out using the following procedures:

(a) Keep the motorcycle turning while braking.

(b) Close the throttle and squeeze the clutch.

(c) Apply both brakes simultaneously.

(d) Avoid locking the rear wheel.

(e) Ease up slightly on the brake as the motorcycle comes to a stop.

(f) Avoid stalling or revving the engine.

(5) Instruction Points--Students will be observed for:

(a) Straightening the motorcycle and coming to a straight line stop.

(b) Locking the rear wheel and causing it to slide outside of the three foot path.

(c) Failure to apply the front brake.

(d) Over application of front brake at the end of the stop (motorcycle drops and must be held up by the student).

(6) Method--Instructors will demonstrate each exercise (inner circle and perimeter road). Emphasis should be given to:

(a) Easing up on the front brake near the end of the stop, and

(b) Avoiding rear wheel skid.

Some students will find themselves stopping with the front wheel across the inner edge of the path. This results from turning the front wheel inward in an attempt to keep the motorcycle from falling as it comes to a stop. It can be overcome by stopping more quickly.

5. Counter-Steering 5 minutes

(1) Purpose--The purpose of this exercise is to allow students to experience the effect of counter-steering.

(2) Range Layout--Students require a path that will allow them to achieve a speed of 15 mph. See the illustrative diagram "Counter-Steering."

(3) Exercise Procedure--The exercise will consist of the following activities:

(a) Students will proceed along a designated path at a speed of approximately 15 mph at 5 second intervals.
(b) At the instructor's signal, the student will "bump" the inside edge of one handlebar and experience the motorcycle dip to that side. The motorcycle will continue on in a generally straight path.
(c) On succeeding trials, students will alternate the handlebars being bumped in order to counter-steer in both directions.
(d) Students will operate continuously, maintaining a normal two-second following distance.

(4) Operating Procedures--Not applicable.

(5) Instruction Points--The instructor will observe to make sure students are applying sufficient pressure to the handlebars to cause a noticeable dip to one side.

(6) Method--Students whose motorcycles are not achieving sufficient lean should be encouraged to bump the handlebars somewhat harder. Students who are performing acceptably should be so informed so that they do not become overly aggressive.

6. Quick Turn 10 minutes

(1) Purpose--The purpose of this exercise is to enable students to perform a 90° turn using a counter-steer (i.e., "outtracking").

(2) Range Layout--The layout should be such as to allow students to achieve a speed of 15 mph with sufficient room on each side for turns of 20 ft. radius to be safely made. If two groups are performing simultaneously, the areas where the turns are made should be separated from one another by at least 50 ft. See the illustrative diagram "Quick Turn."

(3) Exercise Procedure--The exercise will consist of the following activities:

(a) Students will proceed along a path toward the instructor at a speed of 15 mph (one starts as the previous one finishes).
(b) Upon approaching the instructor, the student will be given a hand signal. Upon receiving the signal, the student will execute a 90° turn in a previously determined direction.
(c) Upon completing the turn, the student should assume a path, indicated by the instructor, that will prevent interference with other students.
(d) The direction in which the turn is to be made will be alternated on succeeding trials.

(4) Operating Procedures--Turning by counter-steering, like any other kind of turn, involves precise coordination of steering inputs and cannot be proceduralized.

(5) Instruction Points--The instructor should observe for students failing to use a counter-steer, as indicated by the absence of a sudden dip.

(6) Method--Many students successfully completing Exercise 5 will either forget or be hesitant to use counter-steering in making a full turn. They should be encouraged to initiate the turn with a discernible pressure being applied to the inside of the handlebar.

7. Obstacle Avoidance 10 minutes

(1) Purpose--The purpose of this exercise is to enable students to circumvent an obstacle by means of a counter-steer.

(2) Range Layout--The same general layout employed in Exercise 6 may be used for this exercise. Refer to the illustrative diagram "Obstacle Avoidance."

(3) Exercise Procedure--Students will approach the instructor in the same general manner as described in Exercise 6. However, the following variation in activity will take place:

(a) Instead of making a 90° turn, students will make an "S" turn around the instructor.
(b) On the first several trials, the direction of the turn will be pre-established. However, after students have mastered the maneuver, the direction of turn will be included in the instructor's signal.
(c) The signal should be given when the student is approximately 40 ft. from the instructor. A marker may be used as a reference point.
(d) In making turns, students should achieve a lateral displacement of at least 4 feet to either side of the approach path. To create an "obstacle" for the students, an 8-ft. line may be drawn across the path of travel by means of chalk or paint. Markers should not be used for this purpose since they may cause a fall if struck.
(e) The student's lateral displacement should not exceed 10 feet. However, this limitation is not highly critical since students generally stay well within it.
(f) Once students have performed successfully at 15 mph, speed should be increased to 20 mph. The same criteria of success apply.

(4) Operating Procedures--Not applicable for the reasons stated in Exercise 6.

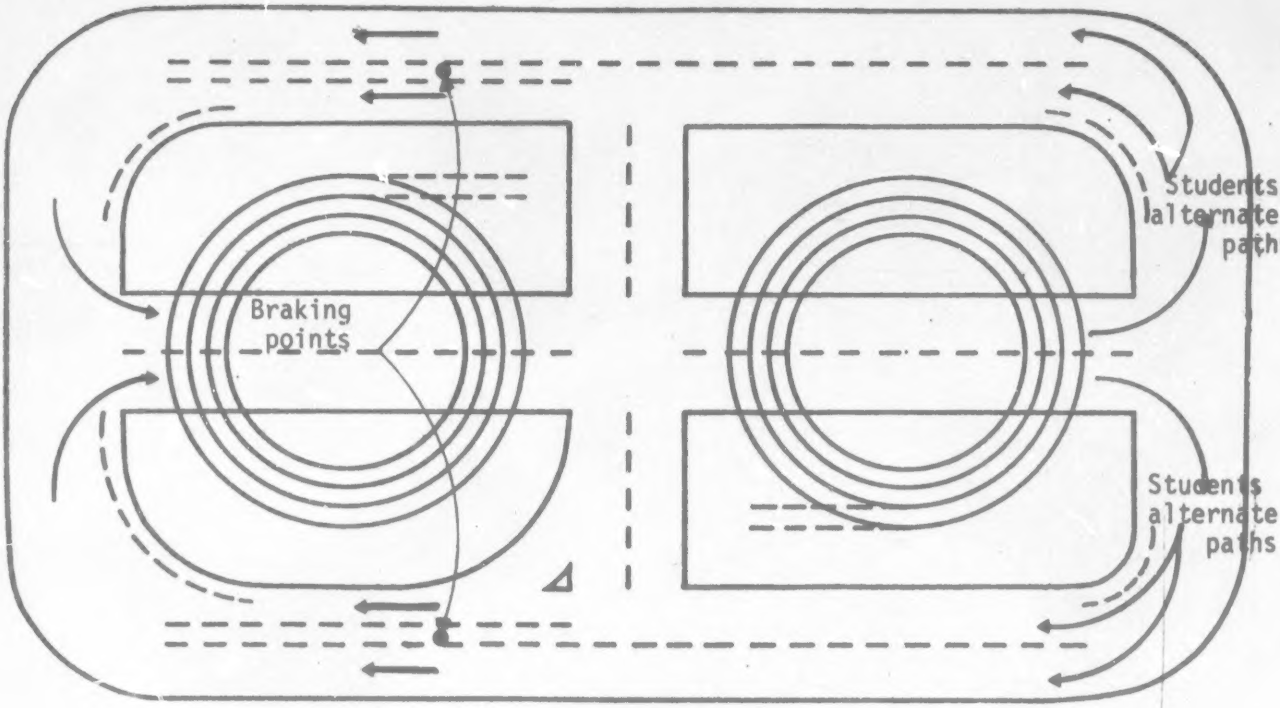
(5) Instruction Points--The instructor should observe for the following:

(a) Inadequate counter-steer resulting in insufficient lateral displacement.
(b) Anticipating the instructor's signal or turning in the wrong direction.

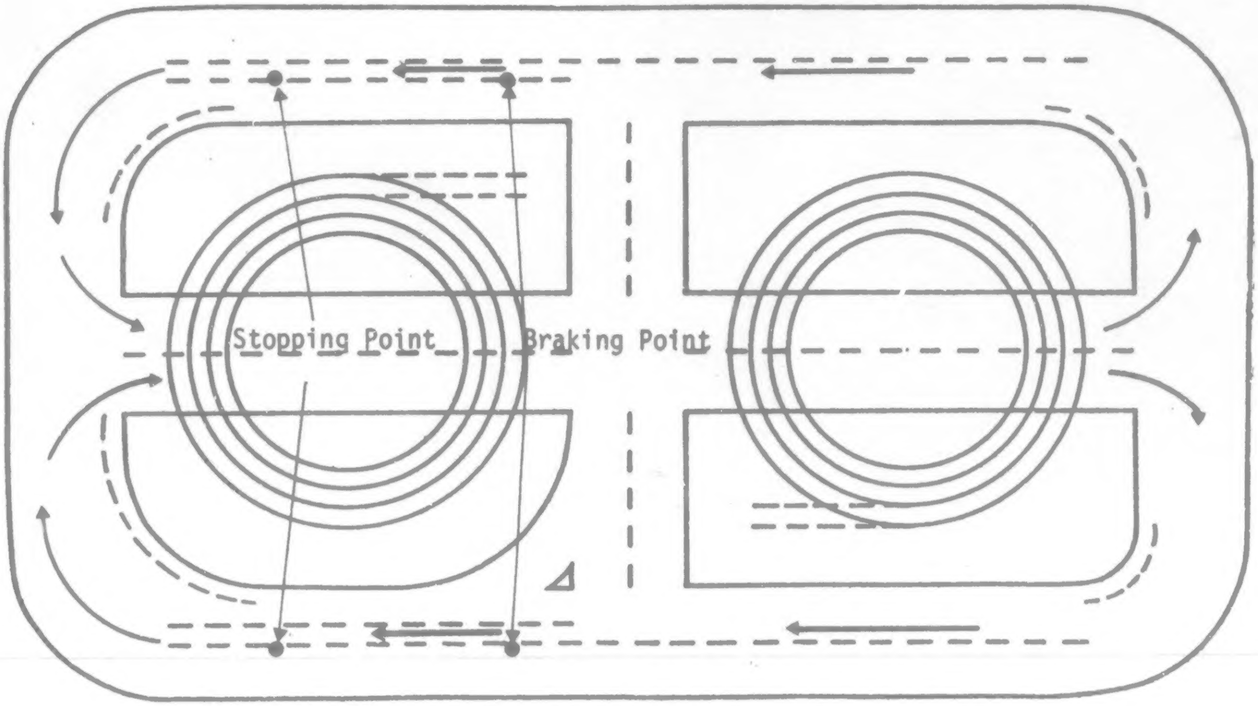
(6) Method--A turn in the wrong direction results from an attempt to anticipate the instructor's signal. This, in turn, generally

indicates a lack of confidence in ability to perform the maneuver in the distance available. Students who attempt to anticipate the signal should be encouarged to concentrate more upon making a correct turn and less upon avoiding the "obstacle." Their success in accomplishing the latter should convince them that it is not necessary to attempt to outguess the instructor.

Exercise 1. Using the Front Brake
(Also used for Exercise 2. Controlling Locked Rear Wheel)


Students alternate paths
Braking points
Students alternate paths

Exercise 3. Maximum Braking Straight


Stopping Point
Braking Point

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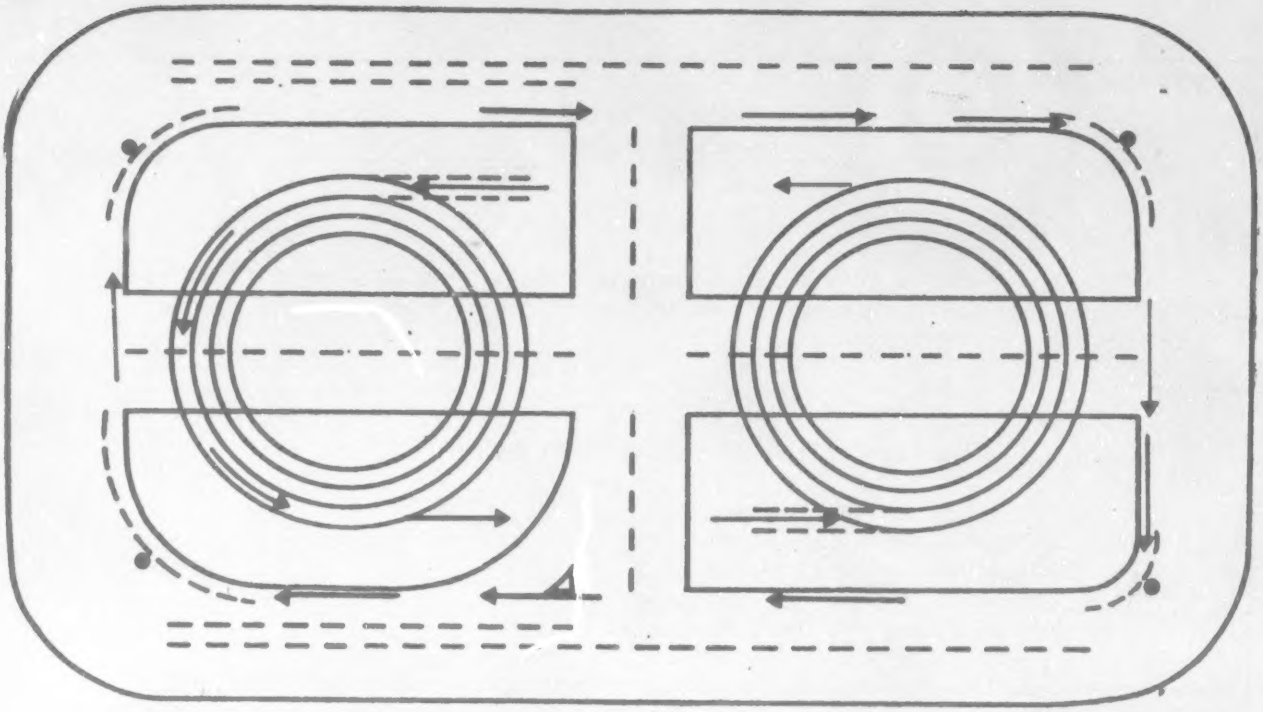
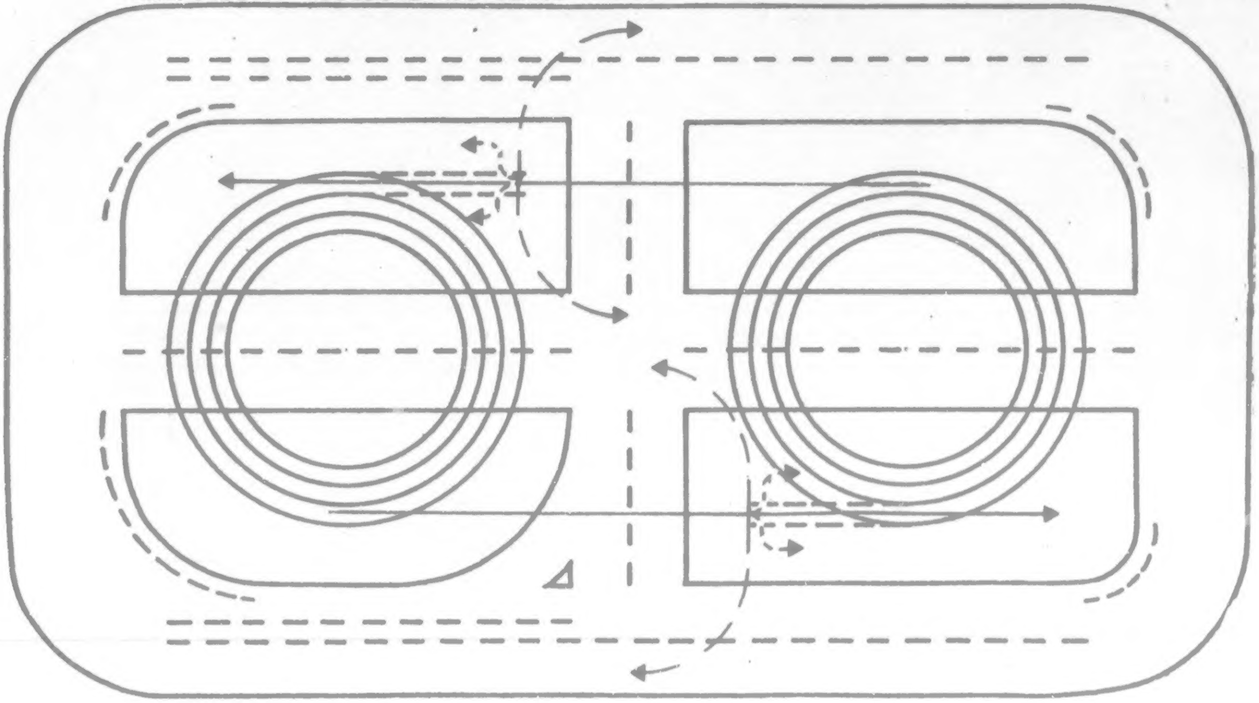
Exercise 4. Maximum Braking: Curve



Exercise 5 Counter-steering ————

Exercise 6 Quick Turn - - - - -

Exercise 7 Obstacle Avoidance – – – – –



MOTORCYCLE SAFETY EDUCATION PROGRAM

UNIT	LESSON	SESSION	TITLE	MODE
III	2	3	Roadway-Traffic Related Skills: Obstacle Surmounting	Range

PURPOSE

The purpose of this Session is to enable students to develop the advanced skills needed to safely surmount obstacles up to four inches in height.

CONTENT

This Session consists of the following exercises:

1. Standing on the Footpegs.
2. Lightening the Front Wheel.
3. Surmounting Small Obstacles.
4. Surmounting Frontal Obstacles.
5. Surmounting Parallel Obstacles

Some students may be apprehensive about undertaking the maneuvers required in surmounting obstacles. The exercises approach the surmounting maneuver in relatively small increments in order to minimize anxiety, facilitate skill acquisition, and enhance safety. Ordering exercises in a sequence of increasing complexity also means that students who are not proficient enough to surmount larger obstacles safely can be identified and provided an alternative to surmounting.

MATERIALS

See Unit Specifications.

EQUIPMENT

In addition to those items identified in the Unit Specifications, instruction in this Unit will require simulated "obstacles." The requirement may be fulfilled by strips of wood, approximately 10 feet in length, having the following dimensions:

1. 1" x 2".
2. 2" x 4".
3. 4" x 4".

FACILITIES

See Unit Specifications.

METHODS

1. Standing on the Footpegs 10 minutes

(1) Purpose--The purpose of this exercise is to enable students to control the speed and direction of the motorcycle while supporting their weight on the footpegs.

(2) Range Layout--No special layout is required. All that is required is a straight path and a designated area over which students will operate while standing on the pegs. After students have acquired proficiency in operating in a straight line, markers may be placed so as to require a serpentine pattern. Refer to the illustrative diagram "Standing on the Footpegs."

(3) Exercise Procedure--The exercise consists of the following activities:

(a) Students operate along the prescribed path in second gear at a speed of approximately 10-15 mph.
- Too slow a speed makes it difficult to operate.
- Too fast a speed may be unnerving to many novices.

(b) Upon reaching the designated area, students will rise upon the footpegs. The remainder of the path may be negotiated sitting down.
(c) A minimum following distance of 40 feet should be maintained between students.
(d) Markers for serpentine course may be set without interrupting the exercise. They should be set individually so as to gradually increase the area over which turns must be made.
(e) Students should be instructed to assume a seated position whenever they are tired.

(4) Operating Procedures--In operating while standing on the footpegs, students will use the following procedures:

(a) Keep the knees slightly bent and held against the gas tank.
(b) Avoid leaning forward and resting upon the handgrips.
(c) Hold the handgrips firmly to keep from falling forward or backward if balance is lost.
(d) Keep the head and eyes up, focusing on the path ahead.

(5) Instruction Points--The instructor should observe for the following errors:

(a) Locked knees.
(b) Leaning forward and placing weight upon the handlebars.
(c) Jerky throttle application.
(d) Wobbly steering.

(6) Method--

(a) The instructor will provide a demonstration and lead the students through the exercise layout.
(b) Students may be pulled aside and given instruction on an individual basis.
(c) The exercise requires considerable strength in the legs. Students who appear to be getting tired should be advised to sit down.
(d) Jerky throttle application and wobbly steering may indicate that too much weight is being placed on the handlebars. Students should be advised to use their knees to hold themselves upright.

2. Lightening the Front Wheel 10 minutes

(1) Purpose--The purpose of this exercise is to enable students to lighten the front end through acceleration and weight shift.

(2) Range Layout--Same as Exercise 1 except for lack of serpentine pattern.

(3) Exercise Procedure--This exercise will consist of the following activities:

(a) Students will operate on the same path used in Exercise 1, and will stand on the footpegs in the same designated area.
(b) As they pass the instructor, students will briefly lighten the front wheel.
(c) Gear selection, speed, and following distance should be as described in Exercise 1.

(4) Operating Procedures--The front wheel will be lightened using the following procedure:

(a) Open the throttle quickly for a sharp acceleration.
(b) At the same time, shift the weight back, using the handgrips for support.
(c) Immediately close the throttle and shift the weight forward again.

(5) Instruction Points--The instructor should observe for the following:

(a) Inadequate acceleration.
(b) Inadequate weight shift.
(c) Poor timing in coordinating throttle application and weight shift.
(d) Pulling unevenly on the handlebars.

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(6) Method--

(a) Don't allow students to attempt "wheelies."
(b) Watch for an exaggerated "wrist up" position resulting in over-acceleration.
(c) Watch the front shock absorbers as an indication. of lightening the front end.

3. Surmounting Small Obstacles 10 minutes

(1) Purpose--The purpose of this exercise is to enable students to develop the coordination involved in surmounting and to experience the shock of the front wheel striking an obstacle.

(2) Range Layout--The range layout is similar to Exercise 1. However, small strips approximately two inches in height (e.g., 2x4's) and 5 feet in length (to keep them from moving) should be placed across the motorcycle's path in the designated area. Initially, only one strip should be used for each path. Later, additional strips may be placed at approximately 40-foot intervals. Refer to the illustrative diagram "Surmounting Small Obstacles."

(3) Exercise Procedure--The exercise consists of the following activities:

(a) Students operate around the prescribed path at speeds of 15-20 mph.
(b) The obstacles will be surmounted as follows:
- On the first few circuits, students should simply ride over the obstacles in a standing position to experience the shock against the front wheel.
- Students will then be instructed to negotiate the obstacles, using the surmounting procedure.

(c) Additional "obstacles" will be added to the path in order to provide more practice.

(4) Operating Procedures-- The obstacles will be surmounted as follows:

(a) Reduce speed to about 10 mph.
(b) Approach the obstacle head on.
(c) Downshift to second gear.
(d) As the front wheel approaches the obstacle:
- Rise up on the footpegs.
- Accelerate quickly.
- Lift weight back.

(e) As the front wheel clears the obstacles, close the throttle and shift weight forward.
(f) Return to a seated position and remain in second gear.
(g) Repeat the procedure for each obstacle.

(5) Instruction Points--The instructor will observe for the following:

(a) Failure to shift to second gear.
(b) Poor timing in acceleration and weight shift.
- Starting too late, with the result that the front wheel strikes the obstacle before the weight comes off it.
- Starting too soon, with the result that weight is shifting forward when the obstacle is struck.

(6) Method--The same as Exercise 2.

4. Surmounting Frontal Obstacles 15 minutes

(1) Purpose--To enable students to safely surmount obstacles across the motorcycle's path.

(2) Range Layout--The layout is essentially the same as described in Exercise 3 except for the following:

(a) Use of larger obstacles (4x4's).
(b) Setting obstacles at an angle to one another to require steering adjustment.

Refer to illustrative diagram "Surmounting Frontal Obstacles."

(3) Exercise Procedure--This exercise consists of the following activities:

(a) Students negotiate the layout, surmounting obstacles as described in Exercise 3.
(b) The obstacles used in Exercise 3 are replaced as follows:
- Initially half of the 2-inch obstacles are replaced by 4-inch obstacles.
- Later, the remaining 2-inch obstacles are replaced by 4x4's.

(c) After students have had an opportunity to surmount all of the obstacles, each of the obstacles is placed at a slight angle in order to require direction changes for a head-on approach.

(4) Operating Procedures--The procedures involved in operating the motorcycle are essentially the same as those described in Exercise 3. The additional height of the obstacles necessitates greater lightening of the front wheel. This, in turn, demands a larger acceleration, greater weight shifts, and more precise coordination of both.

(5) Instruction Points--The same as Exercise 3.

(6) Method--

(a) Since there are no new skills involved in this exercise, a demonstration is not necessary. Students should be informed as to the changes in size and angle of the obstacle and the need to adjust position to approach obstacles head on.
(b) Students who do not evidence proficiency in surmounting two-inch obstacles should be instructed to ride around the four-inch obstacles rather than surmount them.

5. Surmounting Parallel Obstacles 15 minutes

(1) Purpose--The purpose of this exercise is to enable students to safely surmount obstacles that lie parallel to the path of the motorcycle.

(2) Range Layout--The layout is essentially the same as described in Exercise 4 except that the four 2" strips should be placed end to end to create a continuous 40' barrier running the length of the surmounting area. A second 40' section consisting of 4" strips should follow the first.

(3) Exercise Procedure--This exercise consists of the following activities:

(a) Students operate about the range layout using the same speed, following distance, and gear selection as described in Exercise 3.
(b) First, students approach the 2" section along the right edge and surmount it right to left. On the second circuit, they approach along the left and surmount it left to right. On succeeding trials, they alternate directions.
(c) After students have had an opportunity to practice surmounting the 2" section, those who are proficient will be directed to pass it and surmount the 4" section. Those who are not proficient will continue to surmount the 2" section.

(d) Students should not cross the lane boundaries either on approaching the obstacle or after surmounting it.

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(4) Operating Procedures--The exercise will be carried out according to the following procedures:

(a) Reduce speed approximately 10 mph to allow quick acceleration.
(b) Downshift.
(c) Move to the far side of the lane in order to be able to approach the obstacle at an angle.
(d) Turn and approach the obstacle at approximately 45°, maintaining a straight path so as to keep the motorcycle upright.
(e) Surmount the obstacle.
(f) Turn back quickly in the original direction.

(5) Instruction Points--The instructor will observe for the following:

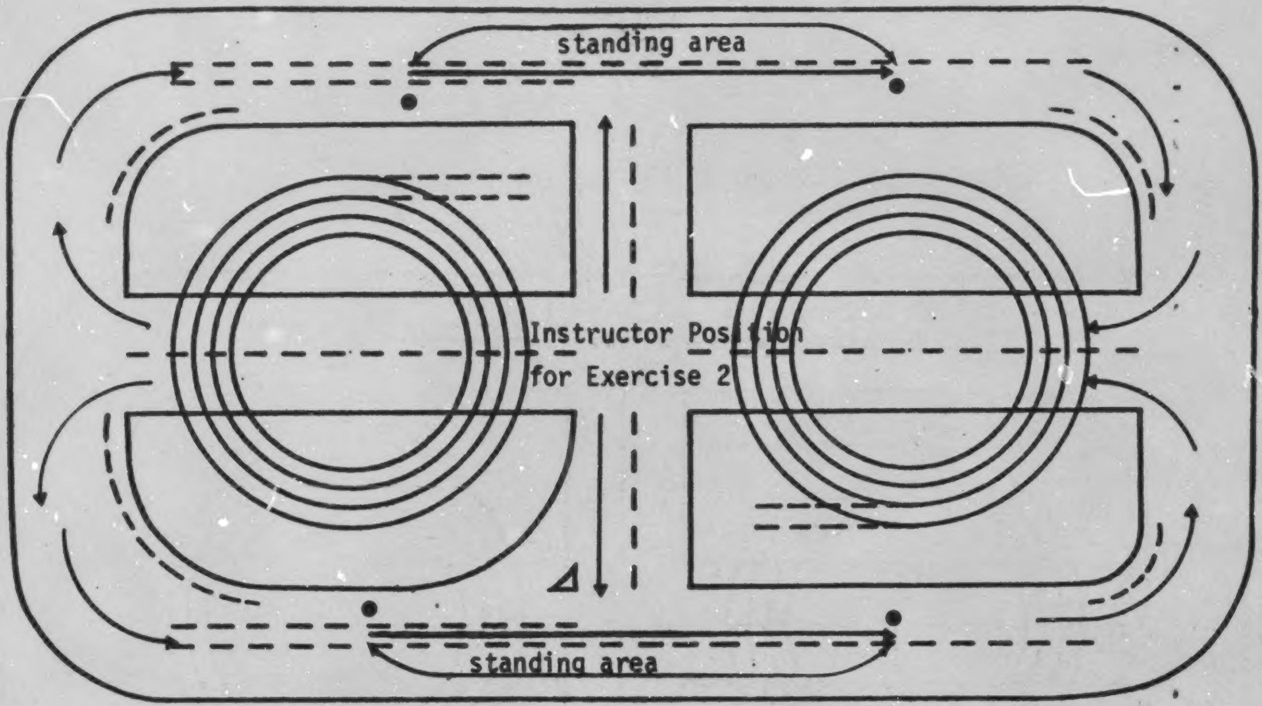
(a) Slight skidding of the rear wheel while slowing for the approach. (Most likely to happen when motorcycle is being turned away from or back toward the obstacle.)
(b) Not moving far enough away from the obstacle or not turning sharply enough to approach from at least a 45° angle.
(c) Turning too sharply and attempting to surmount the obstacle head on.
(d) Failure to turn back in the original direction quickly enough after surmounting.

(6) Method--

(a) The exercise should be fully demonstrated by the instructor before students undertake it. The instructor should emphasize key elements of operating procedures including the importance of:
- A 45° approach angle.
- Moving far enough away from the obstacle to allow a steep approach angle.
- Keeping the motorcycle upright while surmounting the obstacle.
- Turning quickly following surmounting.

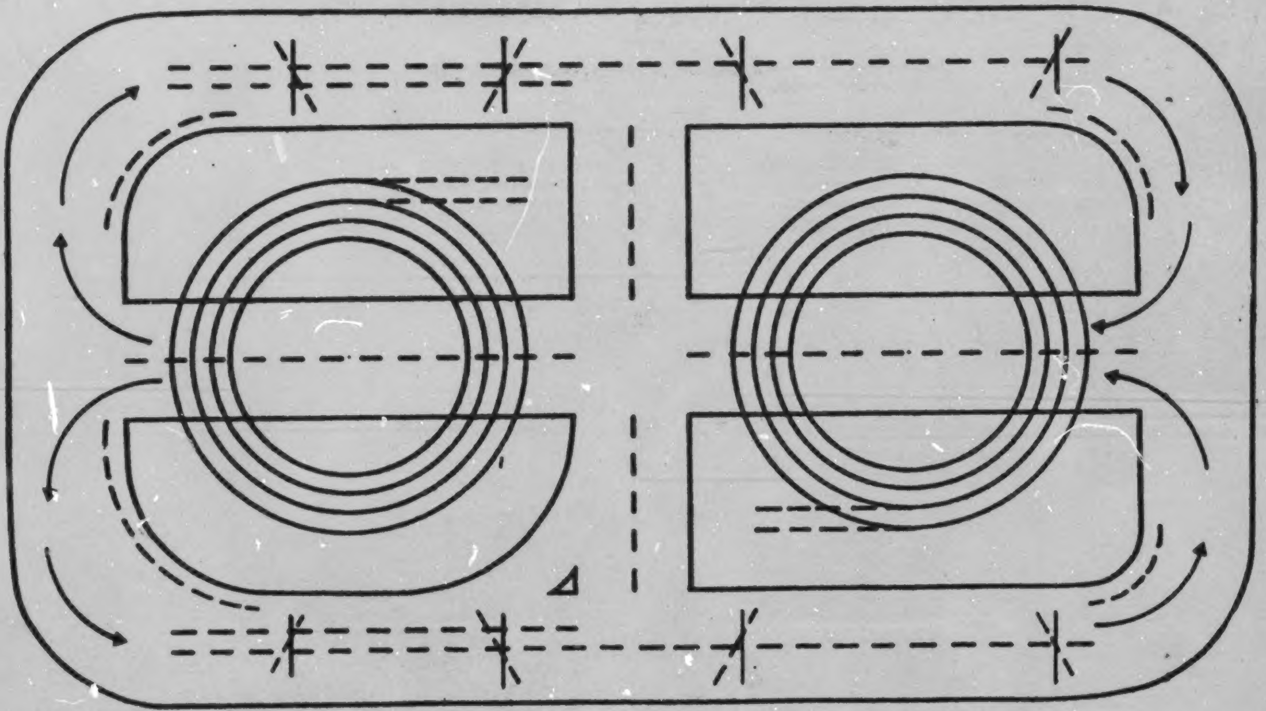
EXERCISE 1 - STANDING ON THE FOOTPEGS.

EXERCISE 2 - LIGHTENING THE FRONT WHEEL


standing area
Instructor Position
for Exercise 2
standing area

EXERCISE 3 - SURMOUNTING SMALL OBSTACLES.

EXERCISE 4 - SURMOUNTING FRONTAL OBSTACLES.

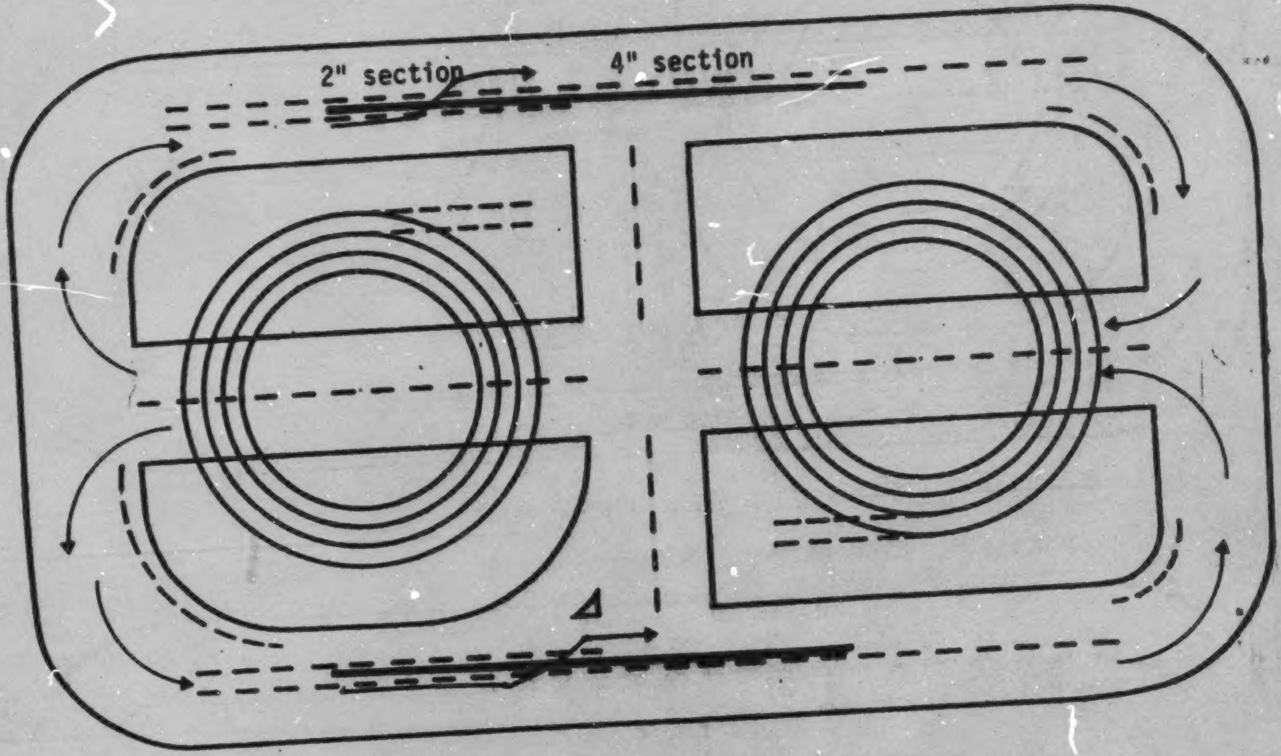


LEGEND:

——— Obstacle position for Exercise 3.

— — — Obstacle position for Exercise 4.

EXERCISE 5 - SURMOUNTING PARALLEL OBSTACLES.


2" section
4" section

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MOTORCYCLE SAFETY EDUCATION PROGRAM

UNIT	LESSON	SESSION	TITLE	MODE
III	2	4	Advanced Street Riding	Street

PURPOSE

The purpose of this Session is two-fold:

(a) To enable students to apply safe riding practices under conditions of heavy traffic, relatively high speed, and degraded roadway surface conditions.

(b) To reduce the anxiety that often accompanies initial exposure to heavy traffic and high speed by allowing it to occur during training, under the supervision of a qualified instructor.

CONTENT

This Session is designed to permit students to continue to apply street riding knowledges and skills developed in Unit II but within a more demanding roadway and traffic environment. The exposure to this environment is delayed until the end of Unit III in order to allow students to develop a higher level of proficiency and greater confidence in their ability to control the vehicle. This delay also allows students to apply advanced skills acquired in Unit III Range Instruction to any potentially hazardous conditions that might arise.

The content of this session involves 20 minutes of operation in heavy traffic and 40 minutes of operation in highway and freeway environments. Depending upon the density of the heavy traffic, it may be desirable to reduce the student:teacher ratio to 2:1 or 1:1 in order to permit closer supervision and to prevent student and teacher from being separated--something that might be likely to happen with a larger formation. The remainder of this session, Operation in Highway and Freeway Environments, may revert to the 3:1 student:teacher ratio normally employed in street riding.

The only way to accommodate the lower student:teacher ratio, without requiring additional staff, would be to extend the duration of the session. For example, the instructor could take the weakest of three students through heavy traffic on an individual basis, then take all three through the roadway and traffic environment, and finally take the remaining two students through heavy traffic. This would only extend the duration of the session by 20 minutes and none of the students would be required to wait.

While operation on a highway and operation on an expressway are described as separate exercises, they would generally occur as one activity. It may be necessary, for example, to use an expressway to get to and from the rural highway segment--or vice versa.

MATERIALS

The materials required in this Session are the same as those described in Session II-4-2, differing only with respect to those characteristics that reflect the specific nature and location of the street routes employed in the Session.

EQUIPMENT

The same as II-4-2.

FACILITIES

This Session takes place on public highways in the following three areas:

City--An urban area characterized by heavy traffic and degraded street surfaces.

Highway--A rural highway characterized by narrow, winding, and hilly roadways with degraded surfaces.

Expressway--A limited access roadway characterized by speeds up to 55 mph. Where no freeway is available, any other highway with speed limits ranging up to 50-55 mph may be used.

METHODS

1. City Operation 20 minutes

(1) Purpose--The purpose of this exercise is to allow students to (a) apply street riding practices under conditions of heavy traffic and degraded roadway conditions, and (b) experience heavy traffic and degraded roadway surfaces under the supervision of an individual instructor.

(2) Route Requirements--Route requirements should be met through use of areas with the following characteristics:

(a) Roadway--The roadways that comprise the selected route should have the following characteristics:
- Broken pavement.
- Sand, gravel, debris (e.g., construction area).
- Trolley or railroad tracks paralleling the path of travel.
- Elevated manhole covers, trip switches.
- Metal gratings.

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- Unmarked lanes (e.g., traffic circles, merge points).
- Uncontrolled intersections, and intersections requiring uncontrolled turns across traffic.

(b) Traffic--The route should provide the following:

- Heavy traffic.
- Traffic mix, including trucks and buses.
- Roadside activities including pedestrians walking in the street, entering cars, leaving parking places.
- Double parked vehicles.
- Visibility restrictions caused by lines of stopped cars, including cross traffic, oncoming traffic (left turns), and adjacent traffic.

(c) Sequence--No specific sequence is necessary at this point in instruction. However, students will generally experience increasing density of traffic in entering and leaving the area of heavy traffic.

(d) Length--The duration of heavy traffic should be approximately ten minutes, allowing the remaining ten minutes for entry and egress. By requiring frequent turns, the exercise may be confined to an area of but a few blocks.

(3) Exercise Procedure--The exercise will be performed as follows:

(a) One or two students will perform the exercise at a time.
(b) The instructor will follow the students in a staggered formation.
(c) No stops for instructional purposes will be scheduled. A student critique will be given at the end of the exercise.

(4) Operating Procedures--Operating procedures would include the full range of normal street operating procedures, including key elements identified in Session II-4-2. However, primary emphasis should be given to the following:

(a) Observing.

- Scanning at least one block ahead, despite the presence of intervening traffic.
- Checking traffic at blind intersections before proceeding.

(b) Lane selection and placement.

- Responding early to traffic and roadway conditions in the path ahead.
- Changing lane or lane position in response to stopped vehicles about to cross, enter, or turn left across the path of travel.
- Avoiding obstructions and hazardous surface conditions where possible.

(c) Obstructions.
- Proper speed, direction, and posture for negotiating obstacles and potentially hazardous surface conditions.

(d) Following distance.
- Maintaining a minimum two-second following distance in the presence of vehicles entering the gap ahead of the motorcycle.

(e) Gap acceptance.
- Acceptance of safe gaps in crossing or oncoming traffic, despite traffic density.

(f) Adjacent vehicles.
- Avoiding operation in another driver's blind spot, despite traffic density.

(g) Lane sharing.
- Discouraging lane sharing by maintaining center lane position.
- Avoiding attempts to squeeze between vehicles or between a vehicle and curb.

(h) Speed.
- Adjusting speed to density of traffic and vision restrictions.

(i) Clearance.
- Making sure that the path ahead is clear before attempting to cross the path of other vehicles.

(j) Communication.
- Timing activation of turn signals so as to avoid confusing other road users.

(5) Instruction Points--Since the instructor will observe all of the student's responses, any errors should be noted and the student apprised of them. However, the instructor should place major emphasis on recall and critique of errors relative to the operating procedures described above.

(6) Method--Elements of instructional method are rendered relatively straightforward by (a) the student's prior experience in street riding sessions, and (b) the 1:1 student-teacher ratio. Those points raised in discussion of "critique" in the Method section of II-4-2 apply to this Session.

2. Highway Operation 20 minutes

(1) Purpose--The purpose of this exercise is to (a) allow students to apply skills and procedures for handling degraded roadway conditions, and (b) experience degraded highway conditions in the presence of an instructor.

(2) Route Requirements--Route requirements should be met through the use of rural highways having the following characteristics:

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(a) Roadway.
- Narrow roadways, including one-lane roads.
- Steep hills.
- Visibility-restricting crests and dips.
- Sharp curves lacking advanced warning or posted speeds.
- High crowned roadways.
- Pavement seams.
- Broken pavement.
- Elevated railroad crossings.
- Rutted surfaces.
- Blind entry.
- Gratings and grooves.

(b) Traffic--Given the nature of the roadways involved, traffic would normally be relatively light. The exercise would not be scheduled for times when traffic is heavy.

(c) Sequence--The sequence of roadway conditions is not important at this point.

(d) Length--The length of the highway should be sufficient to allow each student approximately 5 minutes operation in the lead position. The highway segment may be interspersed with freeway operation, if necessary.

(3) Exercise Procedure--The exercise will be performed as follows:

(a) In areas where traffic is moderate to heavy, students will operate in a staggered formation. Otherwise, they will operate in single file in order to be able to deal independently with various roadway conditions.

(b) In single file formation, the instructor will generally position himself at the rear of the formation. However, the position may be varied in order to permit operation directly behind a marginal student.

(4) Operating Procedures--The student will carry out the exercise using all previously learned procedures for operating safely in the highway traffic environment. However, the following will be given particular emphasis:

(a) Curves.
- Adjust speed prior to entry, particularly on a high crowned road.
- Lane placement for maximum visibility and correct line.

(b) Hills.
- Gear selection and shifting to maintain speed on upgrades and downgrades.
- Proper lane position and speed at sharp crests.

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(c) Reduced traction, e.g., gravel roads, shoulders.
- Speed reduction prior to reaching area.
- Maintain speed and direction (no braking or quick turns).
- Maintain motorcycle in straight up position.

(d) Ruts, rails.
- Proper approach angle.
- Rise slightly on pegs.
- Proper throttle control prior to and following impact.

(e) Rain grooves and gratings.
- Maintain speed and direction; no weaving.

(f) Being passed, particularly by high speed vehicles and trucks.
- Center lane position.
- Firm steering control.
- Anticipate effect of turbulence.

(g) Leaving the highway (side roads, shoulders).
- Signal speed reduction.
- Maintain speed on highway.

(5) Instruction Points--See Exercise 1.

(6) Method--See Exercise 1.

3. Expressway Operation

20 minutes

(1) Purpose--The purpose of this exercise is to allow students to (a) apply street riding knowledges and skills in an expressway environment, and (b) experience high speed operation (maximum of 55 mph) under the supervision of an instructor.

(2) Route Requirements--Route requirements should be met through an expressway having the following characteristics:

(a) Roadway.
- Multiple lanes, preferably at least three (in one direction).
- Merging entrances and exits.
- Maximum speed of 55 mph.

(b) Traffic--Traffic should be of relatively high density and involve a mix of cars and larger vehicles. The density should not be so great as to result in a speed reduction (e.g., rush hour traffic).

(c) Sequence--Not applicable.

(d) Length--Individual segments should be of relatively short duration, e.g., less than 5 miles, in order that each student should be afforded one opportunity to enter and leave the freeway.

(3) Exercise Procedure--The exercise will be performed as follows:

(a) A staggered formation consisting of an instructor and three students will be used.

(b) One student will assume the lead position and will follow a route indicated by the instructor.

(c) After approximately 5-6 minutes, the student will pull off onto the shoulder for an individual critique of performance and to allow another student to assume the lead position.
NOTE: The change of position should occur while on the expressway to provide students an opportunity to practice pulling off onto the shoulder and re-entering traffic.

(4) Operating Procedure--Students will apply all procedures appropriate to operating in the expressway traffic environment. However, particular emphasis will be given to the following:

(a) Entry from entrance ramp.
- Maintaining speed on the entrance ramp.
- Use of turn signal (to increase visibility).
- Frequent headchecks to allow pacing with accepted gap.
- Entry to freeway before reaching the end of the entrance ramp.

(b) Lane selection and placement.
- Use of normal travel lane (usually the center lane).
- Center lane position to minimize effects of passing vehicles.

(c) Exit onto off ramp.
- Early entrance into correct lane.
- Use of turn signal.
- Maintaining speed while on the highway.
- Reducing speed as required by ramp configuration.

(d) Entrance from roadside.
- Gaining speed while still on shoulder.
- Headcheck and signal before entering expressway.
- Crossing pavement edges at appropriate angle.

(e) Exit to roadside.
- Signal speed reduction by hand or flashing brake.
- Use turn signal.
- Maintain maximum safe speed while on the expressway.
- Avoid quick turns or use of brakes on shoulders.

(5) Instruction Points--See Exercise 1.

(6) Methods--See Exercise 1.

UNIT IV. MAINTENANCE

PURPOSE

The purpose of this Unit is to enable students to maintain their motorcycles in safe operating condition.

CONTENT

This Unit consists of one lesson that takes place through two sessions.

Session 1 - Inspection

Session 2 - Servicing

The content focuses upon those activities that are required to keep the motorcycle in safe operating condition and can be performed without either advanced skills or tools other than those furnished with the motorcycle. The potential danger involved in operating a poorly maintained motorcycle, coupled with the lack of ready access to servicing/repair facilities, makes it important that operators be able to handle their vehicle's most common maintenance needs. Students who are not mechanically inclined are often reluctant to tackle a servicing task, such as tightening a chain. If they can be induced to perform it one time, under the supervision of an instructor and with the assistance of another student, they will be less hesitant to perform it on their own vehicle.

PREREQUISITES

None

METHODS

Instruction in this Unit is entirely of a "hands on" variety. Students carry out maintenance tasks under the supervision of an instructor. Each maintenance task is taught through an instructor demonstration followed by a student demonstration.

Instructor Demonstration--The instructor carries out the activity using an operational motorcycle.

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Student Demonstration--The students perform the same activity once. The instructor will observe in order to:

(1) Assess adequacy of performance and point out specific errors.

(2) Identify procedural differences resulting from differences in vehicle make and model.

(3) Give guidance in carrying out tasks where it is necessary.

Students will work in pairs, each pair sharing one motorcycle. This "doubling up" increases the number of students that can be taught at one time and, therefore, expedites instruction without sacrifice of learning effectiveness. In the case of inspection activities, two students can easily perform the same task simultaneously. Where servicing is involved, the students may take turns carrying out the activity.

In a 12-vehicle program, an instructor could instruct an entire class (24 students) with the aid of an assistant instructor or mechanic. In a 6-vehicle program, half the class would be taught at one time by a single instructor.

MATERIALS

Student Materials

Because of the extent to which specific elements of maintenance tasks differ from one motorcycle to another, the informational materials that are identified in Course Specifications would be limited to the following categories of general information:

- The importance of frequent information and servicing in assuring safe motorcycle operation.
- Identification of those maintenance requirements that can be handled by operators.
- Identification of the maintenance requirements that should be referred to qualified mechanics.

For each session, student pairs must be provided copies of owner's or operator's manuals for the motorcycles being used.

Teacher Materials

In addition to materials identified in Course Specifications, teachers will require access to owner's or operator's manuals for operational motorcycles used for instructional purposes.

Instructional Aids

Because instruction will take place outside of a classroom (see "Facilities" below), instructional aids of the type described in the Course Specifications would not be suitable.

EQUIPMENT

The following equipment would be required for each session:

1. Operational motorcycles.
    - One for each student pair.
    - One for an instructor.
2. Complete tool kit for each vehicle to include:
    - Metric wrenches.
    - Flat blade and Phillips screwdrivers.
    - Pliers, channel locks, or vice grips.
    - Feeler gauges.
    - Special purpose wrenches furnished with motorcycles.
3. Cleaning materials including:
    - Oil drain pan.
    - Solvent and large pan for cleaning chains
    - Hand cleaner and tub of warm water.
    - Shop rags.
4. Engine, transmission and lubricating oil, chain lube, brake fluid, and distilled water.

Students should be instructed to wear old clothes or coveralls.

FACILITIES

All three sessions are labeled "classroom" instead of "laboratory" because they do not involve actual operation of the motorcycle. However, they would take place outside of the normal classroom facility. The following two types of areas may be used as a maintenance facility:

1. A large, well-lighted, well-ventilated garage.
2. A paved outside area.

The area that is used should be large enough to allow motorcycles to be positioned in a large circle around the instructor's motorcycle, with at least ten feet between each student motorcycle. A class of 24 students (12 motorcycles) could be accommodated by an area approximately 50 feet square. For a class of

12 students, an area slightly over half that size would be suitable. An outside area should be used only in good weather and moderate temperature (i.e., 60-80 degrees).

OBJECTIVES

Performance Objectives

SELF-MAINTENANCE

The student must be able to carry out those inspection and servicing activities requiring only the use of commonly furnished motorcycle tools, including inspecting, adjusting, repairing, replacing, or servicing the following motorcycle components:

- Frame
- Controls
- Tires
- Wheels
- Chain
- Battery
- Engine oil
- Transmission oil
- Spokes
- Brake fluid
- Spark plugs
- Shock absorbers
- Steering assembly
- Fork alignment
- Oil seals
- Air, oil filters

PROFESSIONAL MAINTENANCE

The student must refer to a qualified mechanic those servicing and repair tasks that the student cannot perform effectively.

Knowledge and Skill Objectives

The student must know the visual indications of hard wear, damage, or maladjustment.

The student must know what maintenance requirements are prescribed by the owner's manual.

The student must know the potential hazard to safety resulting from improperly performed maintenance.

MOTORCYCLE SAFETY EDUCATION PROGRAM

UNIT	LESSON	SESSION	TITLE	MODE
IV	1	1	Motorcycle Inspection	Classroom

PURPOSE

The purpose of this Session is to enable students to carry out a visual inspection in order to identify those motorcycle components that are in need of servicing, adjustment, repair or replacement.

CONTENT

This Session will include the following motorcycle components:

1. Exterior and Frame
2. Controls
3. Tires and Wheels
4. Shock Absorbers and Steering Assembly
5. Electrical System
6. Engine and Transmission Oil
7. Chain

Activity is confined to inspection. While some servicing requirements will be discussed, all servicing and its attendant "mess" are concentrated in the following session (IV-1-2).

MATERIALS

See Unit Specifications.

EQUIPMENT

See Unit Specifications.

FACILITIES

See Unit Specifications.

METHODS

Students will be instructed in carrying out the maintenance activities described below by means of the Instructor Demonstration and Student Demonstration methods described in Unit Specifications.

1. Exterior and Frame

The instructor will describe procedures for inspecting exterior and frame, pointing out the areas involved.

1.1 Oil Leaks

(1) Best checked before the motorcycle is cleaned since cleaning may wash away signs of leakage.

(2) Indications of leakage.

- (a) Discoloration of surface dirt, or engine surface. generally indicates leakage.
- (b) Source of leak.
  - Where leaked oil is cleanest.
  - The leading edge of a horizontal (windblown) oil streak.
  - Small discolored areas themselves.

1.2 Washing

(1) Need for Washing--Damage and loose fastenings are more readily visible when the motorcycle is clean.

(2) Protection--The following areas should be covered (e.g., plastic bags):

- (a) Control levers.
- (b) Muffler openings.
- (c) Air intakes.

(3) Washing Procedures

- (a) Avoid spraying electrical connections, hot engine.
- (b) Avoid extreme water pressure (it can force water into brake drums).
- (c) Use mild soap or detergent.

Note: Actual washing of motorcycles should not be included in the session owing to the following:

- Lack of enough water supplies.
- Insufficient time.
- Accumulation of water in the work area.

However, students should be required to wash motorcycles at least once during the course. Those engaged in off-street instruction might be required to do so after the trail riding session. This will not only provide experience to students but will reduce the burden placed upon maintenance personnel.

(4) Lubrication--Control levers, springs, joints, and chains should be lubricated after each washing. Lubrication procedures will be discussed later.

1.3 Check Fastenings

(1) Reasons

(a) Bolts, nuts, and cotter pins tend to loosen from vibration.
(b) Need to be checked frequently.

(2) Tightening

(a) Use torque specification given in owner's manual.
(b) Lacking a torque wrench, tighten only till "snug." Too much pressure may damage threads, break bolts, or round off heads.

1.4 Check Side and Center Stands

(1) Could cause damage or injury if they fall down during operation.

(2) Check:

(a) Fastenings.
(b) Spring tension.

1.5 Pegs and Handgrips

Check for wear.

2. Controls

Procedures for inspecting the following components will be demonstrated by the instructor and students.

2.1 Cables

All cables will be inspected for the following:

(1) Damage, e.g., broken strands, kinks.

(2) Routing.

(a) Interference with controls.

(b) Pinching between steering assembly, control levers.
(c) Touching engine, muffler.
(d) Extending outward from the motorcycle.
(e) Sharp angle.

2.2 Operation

All control levers should be manipulated and checked for binding or scraping.

2.3 Lubrication

(1) Need--Frequent lubrication is required in order to:

(a) Prevent seizure or binding.
(b) Allow smooth movement of controls.
(c) Prolong cable life.

(2) Procedures--The following points should be lubricated.

(a) Pivot point.
(b) Return springs.
(c) End of control cable (as it enters its sheath).

(3) Lubrication should be applied to both the input and output end of the control, and worked into the sheath.

Note: Student demonstration will be deferred to the next session ("Servicing").

2.4 Adjustment

The play and travel of the following controls should be checked against the specifications contained in the owner's manual:

(1) Front brake.

(2) Rear brake.

(3) Throttle.

(4) Clutch.

3. Tires and Wheels

3.1 Tire Pressure

(1) Importance--Incorrect pressure can affect:

(a) Control--Stability and ability to stop or turn.
(b) Tread wear: potential for blowouts.

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(2) Checking pressure:

   (a) Use hand gauge--pump meters are often very inaccurate.
   (b) Check pressures against those indicated in the owner's manual.
   (c) Check while the tires are cold (unless the owner's manual states otherwise).

3.2 Condition of Tire

(1) Signs of damage:

   (a) Cuts and abrasions.
   (b) Worn valve stem.

(2) Wear.

   (a) General thickness of tread--check against owner's manual.
   (b) Uneven wear.
      - Wear in the center--over-inflation.
      - Wear along the edges--under-inflation.
      - Spot wear--worn wheel bearings or wheel misalignment.

(3) Foreign matter in tread.

(4) Tire valves--moisten the end of valve stem and look for bubbles.

(5) Tire mounting--thin beaded line on the side wall should be equidistant from the rim at all points.

3.3 Wheels

(1) Loose or missing spokes.

   (a) Visual inspection for missing spokes.
   (b) Sound check for loose spokes.
      - Hold screwdriver blade against spokes.
      - Spin wheel.
      - "Dull" sound generally indicates a loose spoke.

(2) Alignment.

   (a) Raise wheel (lay frame on a wooden block).
   (b) Hold object vertically next to tire.
   (c) Spin wheel.
   (d) Observe lateral movement of tire.
   (e) Lateral movement should not exceed 1/16 inch.

3.4 Wheel Bearings

(1) Raise wheel.

(2) Grasp tire and wiggle wheel from side tc side--lateral movement should not exceed 1/8 inch.

(3) Spin wheels.

   (a) Front wheels should spin without noise or resistance.
   (b) Rear wheel should spin smoothly; some noise from rear brake is acceptable.

4. Shocks and Front Fork

4.1 Shock Absorbers

(1) Symptoms of worn shock absorbers.

   (a) Excessive bounding or "clunk" after crossing bumps.
   (b) Drifting or swaying during turns.
   (c) "Wobble."
   (d) Signs of hydraulic fluid leak.

(2) Inspection.

   (a) Compress and release shock absorber.
   (b) Should go up and down smoothly without rebounding.

(3) Adjust rear shock absorber.

   (a) In active operation, shock absorbers should be adjusted to ride characteristics and load.
      - Excessive bounding--too soft.
      - Hard riding, wheel comes off ground--too hard.
   (b) For instructional purposes, students will change the setting and return it to its original position, or that indicated in the owner's manual.
   (c) Both rear shock absorbers should be adjusted to the same setting.

4.2 Steering Assembly

(1) Check front fork--observe for straightness.

(2) Rotate steering head.

   (a) Lift front wheel off the ground.
   (b) Disengage damper control (if any).

(c) Rotate handlebars from side to side.
  - Should rotate smoothly without resistance.
  - Front wheel should turn if motorcycle is leaned to one side.

(3) Check play.

(a) With front wheel off ground, grab front forks and shake steering assembly.
(b) Tighten assembly if loose.

(4) Check gaskets and seals for signs of leakage.

5. Electrical

5.1 Battery

(1) Access to battery.

(a) Generally under seat.
(b) Check owner's manual.

(2) Check electrolyte.

(a) With translucent battery housing, check level against marks on housing.
(b) With opaque battery housing:
  - Remove caps.
  - Fluid should cover battery plate (barely).
(c) Add water if necessary (use distilled water).

(3) Cables and terminals.

(a) Check for corrosion.
(b) Clean with baking soda (describe but do not demonstrate).
(c) Coat terminals with petroleum jelly.

(4) Power--Headlight intensity should not vary with engine speed.

5.2 Electrical Adjustments

(1) Brake light switch.

(a) Refer to owner's manual for location and adjustment procedure.
(b) Instructor and student demonstration should maladjust and readjust for proper operation.

(2) Head light.

  (a) Instructor will describe proper headlight adjustment--illuminates roadside markers on high beam but not on low beam.
  (b) Instructor and student may demonstrate adjustment procedure, but not proper adjustment (only possible at night).

6. Oil Levels

6.1 Engine Oil

(1) Important.

  (a) Lack of oil can cause engine seizure, possible fall.
  (b) Excessive oil can damage gaskets and seals.

(2) Procedure.

  (a) Dip stick.
  (b) Window.
  (c) Separate oil tank.

(3) Add oil if necessary.

6.2 Transmission Oil

(1) Remove oil filler bolt or dipstick.

(2) Refer to owner's manual for correct level.

7. Chain

7.1 Chain Wear

Visually inspect for the following:

(1) Lubrication.

  (a) Inside and outside of chain should be wet.
  (b) Chain should not be dripping oil.

(2) Dirt.

(3) Rust.

(4) Wear.

    (a) Pull rearmost link back.
    (b) Should not move more than one-half the length of the sprocket tooth.
    (c) Asymmetrical teeth indicate excessive wear.

7.2 Chain Adjustment

(1) Importance.

    (a) If too tight, causes excessive wear.
    (b) If too loose, may come off sprocket and seize the rear wheel.

(2) One student sits on seat.

    (a) Adjustment must be checked under normal weight load.
    (b) If someone were not available, the operator could lean across the seat to compress the shock absorbers.

(3) Check tension.

    (a) Check chain at midpoint.
    (b) Should move about 1/2 - 3/4 inch up and down.

(4) Check adjustment marks; should be the same on both sides.

MOTORCYCLE SAFETY EDUCATION PROGRAM

UNIT	LESSON	SESSION	TITLE	MODE
IV	1	2	Motorcycle Servicing	Classroom

PURPOSE

The purpose of this Session is to enable students to adjust and service motorcycle components not requiring extensive tools or advanced skills.

CONTENT

This Session includes procedures for servicing the following components:

1. Controls.
2. Oil/Filter Change.
3. Spark plugs.
4. Chain.
5. Additional Maintenance Requirements.

MATERIALS

See Unit Specifications.

EQUIPMENT

See Unit Specifications.

FACILITIES

See Unit Specifications.

METHODS

The instructor will describe and demonstrate the servicing procedures described below. Each instructor demonstration will be followed by a student demonstration in which the students will work together in carrying out the activity.

1. Controls

1.1 Brake Adjustment

(1) Need--Improper adjustment may result in the following:

- (a) Inability to apply brakes fully.
- (b) Inadvertent application or over-application of brakes.
- (c) Catching fingers between front brake lever and handgrip in full application of front brakes.

(2) Procedure--Students will adjust front and rear brake adjusting nuts for the amount of play and travel indicated in owner's manuals. As a general guide, the following conditions should prevail following adjustment:

- (a) Distance between front brake lever and handgrip is about 2-1/2 inches in the fully applied position.
- (b) The foot brake should travel approximately one inch to the fully-applied position.

1.2 Clutch and Throttle

Clutch and throttle should be adjusted according to specification in the owner's manual. When adjusted, controls should allow a small amount of play to prevent inadvertent application and excessive wear.

(1) Improper adjustment of clutch and throttle control may result in the following:

- (a) Inability to apply control fully; clutch slip or drag.
- (b) "Touchy" throttle control resulting in inadvertent over-application of the throttle.

(2) Procedure--See owner's manual.

2. Oil/Filter Change

(1) Need

- (a) Changing oil at recommended intervals prolongs engine life.
- (b) Oil must be changed more frequently when the motorcycle is used:
  - In off-street operation.
  - For relatively short periods of time.

(2) Procedure

- (a) Start engine and warm it up for 5 minutes.
- (b) Refer to owner's manual for removal of oil filter (while engine is warming).
- (c) Stop engine, remove filter and drain oil.

(d) Replace oil.
(e) Replace filter if necessary.

Note: If oil is dirty, it should be replaced with fresh oil. However, if the oil has just been changed by a previous class, or by maintenance personnel, this same oil may be poured back into the crankcase. The filter may also be replaced if appropriate.

3. Spark Plugs

3.1 Need for Servicing

(1) Routine servicing--Plugs should be removed and examined according to intervals prescribed in the owner's manual.

(2) Plug failure--The following are symptoms of foul or dead plugs.

(a) Misfiring.
(b) Failure to start.
(c) Rough idling.

(3) Frequency of servicing depends upon vehicle type.

(a) Two-stroke engines foul plugs more quickly than four-stroke engines.
- Burning of oil with gas tends to foul plugs.
- Plugs should be checked every 500 miles.

(b) One-cylinder engines are more sensitive to the effect of a fouled plug.

3.2 Removal-Replacement Procedure

(1) Use appropriate plug wrench.

(a) Usually provided with motorcycle.
(b) Automobile plug wrenches are not generally the correct size.

(2) Make sure the base of the plug is well seated in the wrench in order to prevent breaking the plug.

(3) Replacement.

(a) Start plug with the fingers to prevent forcing and cross-threading an improperly seated plug.
(b) Tighten snugly but not excessively.
- If torque wrench is available, use owner's manual for correct pressure.
- Excessive pressure may damage engine block.

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3.3 Inspecting Plugs

The instructor will describe and, if possible, illustrate with actual spark plugs, the following conditions:

(1) Electrodes are light tan to medium gray--normal "healthy" spark plug.

(2) Electrodes are burned or white--may mean any of the following:

  (a) The type of plug is too "hot."
  (b) The fuel mixture is too lean.
  (c) There is insufficient oil in the fuel mixture.
  (d) Ignition timing is excessively advanced.

(3) Electrode and insulator are black--may indicate one of the following:

  (a) Spark plug is too "cold."
  (b) Fuel mixture is too rich.
  (c) There is too much or the wrong type of oil in the fuel mixture.
  (d) Ignition timing is retarded.

3.4 Servicing Plugs

(1) Clean with a wire brush or electrical spark plug cleaning device.

(2) Adjust plug gap.

  (a) Consult owner's manual for gap specification.
  (b) Measure gap with feeler gauge.
  (c) Use notch in feeler gauge or needle nose pliers to adjust gap.
  (d) The feeler gauge should pass through the gap with firm, even resistance.

Note: Those students who have never adjusted a spark plug gap before may need individual instruction.

(3) Plug Replacement.

  (a) Frequency of replacement.
  - At intervals specified by the owner's manual.
  - When cleaning fails to overcome symptoms of foul plugs.

  (b) Replace with plugs meeting manufacturer's specification. Improper plug could cause damage to pistons.

4. Chain

4.1 Need for Servicing

The instructor will discuss need for servicing, including the following:

(1) Normal chain life--generally about two years of normal riding ; varies greatly depending on conditions.

(2) Effect of improper servicing upon wear--decreases as much as 50%.

(3) Additional servicing needs under the following conditions:

- (a) Rural gravel or dirt roads.
- (b) Muddy roads (e.g., early spring).
- (c) Off-street operation.

4.2 Chain Removal

The instructor and student will demonstrate removal of the chain. (Note: Since students in each pair will work jointly in removing the chain, the operation need be performed only once.) Students will refer to the owner's manual for removal procedure.

4.3 Inspection

While the chain is removed, the instructor will describe and the students will perform the following inspection:

(1) Chain.

- (a) Broken or worn rollers.
- (b) Stretch--the length of the chain should stretch no more than one-quarter inch for each foot.
- (c) If possible, the instructor should display a worn chain and illustrate stretch.

(2) Sprockets.

- (a) Check for broken, rounded, or hook-shaped teeth.
- (b) If possible, the instructor should display a worn sprocket.
- (c) Sprocket should be replaced to avoid quick deterioration of the chain.

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4.4 Lubrication

The instructor and student should demonstrate lubrication of the chain.

(1) Wipe off dirt and excess oil.

(2) Soak chain in solvent.

(3) Wipe dry (blow dry if compressed air is available).

(4) Brush on oil (20-30 weight) or chain lube.

4.5 Replace Chain

The instructor and student should demonstrate replacement of chain.

(1) Replace chain on sprockets.

(2) Position so that the two ends are on the top of the rear sprocket (to allow sprocket teeth to hold chain in place).

(3) Replace master link.

4.6 Adjust Chain

(1) The instructor and student will demonstrate adjustment of chain tension.

(2) With the instructor watching, students should check chain tension using procedures described in IV-1.1.

5. Additional Maintenance Requirements

The instructor will describe additional maintenance required for safe, reliable and economical operation.

5.1 Servicing Requirements

(1) Wheels.

(a) Alignment.
(b) Wheel bearings.
(c) Brake linings.
(d) Spokes.

(2) Fuel System.

    (a) Filter.
    (b) Sediment bowl.
    (c) Float chamber.
    (d) Oil pump.

(3) Engine.

    (a) Breaker points.
    (b) Compression.
    (c) Valves.
    (d) Timing.

(4) Carburetor.

(5) Steering head assembly and bearings.

(6) Swing arm assembly.

(7) Shock absorbers, front fork.

5.2 Meeting Servicing Requirements

(1) Above components should be serviced by mechanic unless operator is qualified.

    (a) The typical operator lacks tools and skills.
    (b) Improper maintenance can cause damage and create a safety hazard.

(2) Owner's manual should be consulted for frequency of servicing requirements.

UNIT V. OFF-STREET OPERATION

PURPOSE

The purpose of this unit is to enable students to gain the skills required to operate safely in the off-street environment.

CONTENT

Lesson 1 - Basic Off-Street Operation

Session 1 - Basic Off-Street Operating Principles (Classroom)
Session 2 - Basic Off-Street Operating Skills (Practice Area)
Session 3 - Basic Trail Riding (Trail)

Lesson 2 - Intermediate Off-Street Operation

Session 1 - Intermediate Off-Street Operating Principles
Session 2 - Intermediate Off-Street Operating Skills (Practice Area)
Session 3 - Intermediate Trail Riding (Trail)

This unit focuses upon those skills that are needed by students to operate safely in a normal recreational environment. It is not intended to encourage or enable students to seek the challenge of very difficult and potentially dangerous terrain. Competition, either with nature or with other riders, is not within the scope of this unit. The focus is exclusively upon safety.

While the primary objective of this unit is safety of operation in the off-street environment, there is potential benefit to safety of on-street operation as well. The activities that make up laboratory instruction should enable students to develop vehicle handling skills to a level of proficiency that would not be attained in normal day-to-day street operation. Many authorities believe that such proficiency is of benefit in coping with an emergency which occasionally occurs in the traffic environment. Indeed, it is held, that the off-street environment provides the only place in which riders are likely to develop and maintain the skills needed to cope with traffic emergencies.

The organization of unit instruction follows an easy to difficult sequence. In fact, it is the difficulty factor which distinguishes between lessons 1 and 2. The classroom topics and laboratory situations dealt with in the two lessons are the same in kind; it is only the degree of difficulty that differentiates between the two.

The six hours of instruction that make up this unit represent a bare minimum for safe operation in an off-street environment. With additional instruction, students can operate more efficiently and handle more difficult terrain. Such additional instruction could be provided by (1) extending the duration of the Practice Area and Terrain sessions to two hours and/or (2) providing additional trail sessions meeting the general requirements set forth in the final session (V-2-3).

Laboratory activities are not structured to the same level of detail as characterized previous units. The reason is that specific activities are determined by the characteristics of the particular off-street areas in which instruction is taking place. These characteristics differ too much from one location to another to allow uniform activities to be specified.

Because session activities are relatively unstructured, it is neither possible nor necessary to prescribe specific time limits to the activities themselves or to the sessions. Each of the laboratory sessions could easily be extended to two hours, or repeated on another day, without loss of instructional value or student interest. This would extend the duration of our off-street instruction from six to 10 hours, thus extending the range of conditions that students are able to deal with. The duration of instruction would be determined primarily by student interests and instructional resources rather than by the specific requirements set forth in the specifications.

PREREQUISITES

In order to undertake instruction in Unit V, students must have met all objectives of Unit I. Students whose basic control skills are marginal will be unable to cope with laboratory instruction of this unit.

It is also strongly desirable that students meet objectives of Unit IV, Maintenance, prior to undertaking this unit in order that they may assume some of the responsibility for servicing and repair. The wear and tear involved in off-street operation is such to impose an inordinately great burden upon instuctors and assistants if they were not aided by students.

METHODS

Instruction is this unit is similar to that of Unit III in that it concentrates heavily upon laboratory exercises designed to (1) extend previously learned control skills to the level necessary to cope with the rigors of the off-street environment, and (2) develop the new skills that are needed to handled situations that are unique to the off-street environment. Classroom instruction focuses primarily upon the procedural components of the manipulative skills to be learned during laboratory instruction.

MATERIALS

Student Materials

In addition to student materials identified in Course Specifications, requirements for Unit V include the following:

(1) Maps of locations to be used as off-street practice Areas and Trails.

(2) Procedures to be followed in Area and Trail instruction including formations, precautions and signals.

(3) Requirements relative to clothing and protective gear.

Teacher Materials

In addition to teacher materials identified in Course Specifications, teacher materials should include the following:

(1) Guidance in selection of locations suitable for Area and Trail instruction.

(2) Procedures to be used in seeking permission for use of off-street areas including any forms required for relieving landowners of liability for accidents or damage.

(3) Procedures for trail instruction, including formations and signals.

Instructional Aids

Instructional aids required by this unit include the following:

(1) Demonstration Aids--Aids that permit the instructor to demonstrate the specific behaviors and coordinations that make up the performances to be learned, e.g., body angle, fore-aft seat position, use of feet, etc. All of the activities are capable of being demonstrated through the use of static visuals. However, dynamic visuals have the advantage of providing a demonstration of the entire response pattern in real time. The presentation must, however, be capable of being frozen at various points in the response pattern so that each element of the response may be observed.

Where suitable commerical footage is unavailable, or cannot be purchased, "homemade" Super 8 films are inexpensive and relatively easy to make in the off-street environment. Super 8 projection equipment capable of freeze frame presentation is relatively inexpensive.

(2) Explanatory Aids--Aids that illustrate the advantage of performing activities in the prescribed manner, e.g., illustration of the effect of headlight use upon detectability in wooded areas.

EQUIPMENT

Equipment requirements identified in Course specifications should be modified as described below.

Operational Motorcycles

As noted in the Course specifications, combination street/trail bikes would fulfill requirements of this Unit. Trail bikes are suitable but less desirable since (1) they could not be used for other Units, and (2) they would have to be transported to the instruction site, something of a problem when 12 motorcycles are in use.

A few bikes in the maximum size range (i.e., 200cc) should be provided for heavier students.

Because of the wear and tear involved, some dealers will not permit loaned motorcycles to be used for Off-Street instruction. In such cases it may be necessary to limit enrollment to students who are able to supply their own motorcycles.

Protective Gear

Clothing should be made of durable fabic. Old clothes should be used since they are likely to get dirty and may be torn.

Full boots are required.

Vehicle Parts and Supplies

Damaged vehicles will be returned to the maintenance facility for repair. The only parts that need be brought to the instruction site are spark plugs. The lack of on-site maintenance facilities makes it important that motorcycles be inspected for operating condition and fuel supply before leaving the storage area.

Support Equipment

The markers (e.g., traffic cones) identified in Course specifications would serve to create paths through terrain in order to create particular exercises and to separate traffic.

In addition to a first aid kit and fire extinguisher, the following should be brought to the instruction site:

- Insect repellent.
- Drinking water.

FACILITIES

Classroom

Classroom facilities must meet requirements for the Course specifications.

Practice Area

One or more off-street practice Areas must be provided in order to allow semi-structured activity in development of off-street riding skills. The practice Area fulfills for off-street instruction a role analagous to that of a Range in on-street instruction. Range areas must meet the following conditions:

(1) Sufficiently open and unobstructed as to allow one instructor to supervise up to six students engaged in different activities.

(2) Be relatively close to the Range facility, or wherever motorcycles are stored so as to minimize travel time. This is particularly important where combined class/laboratory sessions are conducted.

(3) Free of other motorcycle operators.

(4) Offer as many of the following conditions as possible:

- Sandy areas of at least fifty feet in length, with sand running from two to six inches in depth.
- Hills with grades ranging between 15% and 30% and 10 to 30 feet in length.
- Obstacles such as logs, rocks, fallen fence posts, ranging up to 12 inches in height.
- Muddy areas; small creek if possible.
- Drop-offs up to 12 inches in height.
- Deep ruts.

Trail

One or more lengthy trails should be provided to allow students to apply off-street operating skills in a realistic trail environment. The trails fill a role analagous to that of public streets and highways in On-street courses. To meet the requirements of this Unit, the trail area should meet the following conditions:

(1) Allow operation over several miles without traversing the same area. One segment of a longer trail may be used provided it can be entered and exited without difficulty.

(2) Each trail should provide as many of the following as possible:

- Terrain characteristics previously identified under Area facilities.
- Areas where vision is obscured by trees, tall grass, bushes, etc.
- Creeks or streams ranging up to a foot in depth.
- In at least one trail, various terrain features should be confined to the lower levels of difficulty (e.g., no steep hills, deep sand or water, large obstacles) so that they may be used for initial instruction.

MOTORCYCLE SAFETY EDUCATION PROGRAM

UNIT	LESSON	TITLE
V	1	Basic Off-Street Operation

PURPOSE

The purpose of this lesson is to introduce off-street operation and to develop those skills needed (1) in order to operate in a relatively easy off-street environment, and (2) as a basis for acquisition of higher level skills.

OBJECTIVES

Performance Objectives	Knowledge and Skill Objectives
Speed Limitations	
The student must adjust speed to sight distance and surface conditions.	The student must know the potential unseen hazards such as other trail users, dropoffs, and logs.
Hills	
The student must be able to select the appropriate course and speed for negotiating an upgrade or downgrade.	The student must know the characteristics of upgrades and downgrades that affect the ability of the motorcycle to maintain speed, direction, and balance.
	The student must be able to combine cues of gradient and motorcycle speed in order to select the proper approach speed and path of ascent or descent.
The student must be able to climb gentle hills.	The student must know the proper posture for negotiating upgrades.
	The student must be able to control motorcycle speed, direction and balance from appropriate hill-climbing stance.
The student must be able to maintain speed and traction on downgrades	The student must know the proper weight distribution and gear selection for operating on downgrades.
	The student must be able to adjust the brake pressure and steering to maintain balance and control and to recover from skids, when operating on a downgrade.

Performance Objectives	Knowledge and Skill Objectives
Obstacles The student must be able to select a safe path through obstacles.	The student must know the hazards imposed by obstacles including slippery surfaces, rocks, small plants and shrubs, and an adequate clearance between trees and other large obstacles.
The student must be able to surmount obstacles that do not exceed the ground clearance of the motorcycle (without lofting).	The student must be able to alter weight distribution and control throttle application so as to lighten the front end when surmounting obstacles such as logs, and rocks.
Water The student must be able to determine if water can be negotaited safely.	The student must know the nature of underwater hazards, including slippery rocks, mud, dropoffs, and broken glass. The student must know the potential damage to engine that may result from operating in water of excessive depth or allowing the motorcycle to fall while it is in the water.
The student must be able to maintain speed, direction, and balance while operating in shallow water.	
The student must be able to check and restore motorcycle brake efficiency after traversing water.	The student must know the effects of wet brake linings upon braking efficiency.
Sand The student must be able to maintain traction and momentum when operating in sand.	The student must be able to regulate throttle, gear shift, and body weight distribution in order to lighten the front end and maintain traction and momentum when operating in sand.
The student must adjust steering and throttle control to maintain direction and to turn in heavy sand.	The student must be able to adjust steering and throttle coordination of the altered surface traction of light sand.

MOTORCYCLE SAFETY EDUCATION PROGRAM

UNIT	LESSON	SESSION	TITLE	MODE
V	1	1	Basic Off-Street Operating Principles	Classroom

PURPOSE

The purpose of this session is to introduce off-street operation and communicate principles for handling those terrain conditions that require only basic control skills.

CONTENT

This unit consists of the following topics:

1. Introduction to Off-Street Operation
2. Visibility Limitations
3. Sand
4. Obstacles
5. Hills
6. Water

This unit focuses upon principles by which students may apply previously acquired skills to terrain characteristics encountered in the off-street environment. Students should not be exposed, either in verbal instruction or through visual aids, to conditions that cannot be handled on the basis of instruction received in Unit I. Situations that appear potentially dangerous, such as "lofting" over logs, or climbing steep hills, may cause those students who are lacking in confidence to discontinue instruction.

MATERIALS

Student Materials

See Unit specifications.

Teacher Materials

See Unit specifications.

Instructional Aids

Instructional aids required in support of session instruction include the following:

(1) Static visuals capable of illustrating the following:

- (a) Trail hazards as they actually exist and as hidden from the rider by sight limitations.
- (b) Obstacles commonly encountered in the off-street environment.
- (c) Potential under-water hazards.

(2) Dynamic visuals demonstrating procedures for handling the following:

- (a) Sandy surfaces.
- (b) Obstacles.
- (c) Upgrades and downgrades.

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METHODS

1. Nature of Off-Street Riding

By way of introduction to this Session, the instructor will briefly discuss the following:

1.1 Benefits of Off-Street Riding

(1) Recreation

(a) Exercise
(b) Group Activity

(2) Skill Development

(a) Provides an opportunity to develop basic skills transferrable to street riding.
(b) Provides one of the ways of developing the advance skills needed in handling on-street emergencies.

1.2 Hazards

(1) Many injuries occur in off-street riding.

(a) Extent unknown; records of off-street injuries not generally kept.
(b) Off-street injuries are probably greater in number, though lower in severity, than on-street injuries.

(2) Common causes of injury:

(a) Tree branches.
(b) Large rocks, logs, stumps.
(c) Gravel, rocky surfaces.
(d) Tall grass, concealing holes, rocks, debris.
(e) Narrow passages--grab tires, handlebars.

(3) Objective of instruction.

(a) To assist students in recognizing and coping with potential hazards.
(b) Does not include the "challenge" involved in coping with unnecessary hazards:
- No long steep hills.
- No "jumping" large obstacles.

(c) Does not involve competition; all operation at relatively low speed.

2. Visibility Limitations

2.1 Nature of Limitations

Using static visual aids, the instructor will compare the rider's point of view with actual trail conditions in order to illustrate the manner in which hazards may be concealed by the following:

(1) Hills

(2) Curves

(3) Trees, brush

(4) Tall grass

(5) Water

(6) Boulders

2.2 Procedures for Improving Visibility

The instructor will discuss the importance of the following in reducing danger from unseen hazards:

(1) Improving the ability to see.

(a) Reduce speed.

- Allows more time to respond.
- Allows quicker turns and stops.
- Reduces injury in the case of a collision or a fall.

(2) Improving detectability.

(a) Daytime use of headlights.
(b) Bright colored gear.
- Helmet
- Clothing

(c) Standing on pegs
- Helps to see over the tops of hillcrests.
- Provides better perspective in tall grass, water.
- Allows quick collision avoidance responses.

2.3 Night Riding

The instructor will discuss the special dangers involved in trail riding at night.

(1) Nature of hazard.

- (a) Branches
- (b) Dropoffs
- (c) Water
- (d) Surface conditions
  - Ruts
  - Mud
- (e) Other trail users

(2) Avoiding hazards.

- (a) Avoid night trail riding if at all possible.
  - Schedule return well before sundown.
  - Return to highway before dark.
- (b) Keep headlight mounted on the motorcycle in case night operation becomes necessary.

3. Sand

Using dynamic visuals, the instructor will describe the basic procedures for handling sandy surfaces of various depths under differing conditions (e.g., damp vs. dry).

3.1 Speed

(1) Entering speed.
- (a) Maintain moderate speed--20 mph if possible--in order to overcome resistance of sand.
  - Insufficient speed may allow front tire to wobble or sink.
  - Excessive speed may result in a fall if the front wheel is deflected by sand.
- (b) Operate in a gear that provides moderate engine speed.
  - Excessive engine speed may cause rear wheel spin.
  - Insufficient engine speed will result in a stall.

(2) Maintaining speed.
- (a) Maintain moderate speed.

- (b) If it is necessary to downshift:
  - Shift quickly to prevent loss of speed.
  - Maintain high engine speed during shifting; do not close the throttle completely.

(3) Slowing.

- (a) Gradually reduce speed to prevent an abrupt stop.
  - Gradually close throttle.
  - Avoid use of brakes.

- (b) If it is necessary to brake, use the rear brake primarily.

3.2 Directional Control and Balance

(1) Maintain course.

- (a) Allow motorcycle to wander back and forth.
  - Wandering results from the effect of sand against the front wheel.
  - Ride with it; don't fight it.
- (b) Minimize direction changes; turning makes it difficult to maintain balance.

(2) Turning--If it becomes necessary to turn:

- (a) Turn very gradually.
- (b) Resistance of sand causes a speed reduction in a sharp turn; may result in loss of balance.

3.3 Body Position

(1) In deep sand, rise up on pegs to allow quick weight shifts needed to maintain balance.

(2) In shallow sand, move slightly back on the seat.

- (a) Increases rear wheel traction.
- (b) Lightens front wheel to prevent it from digging into the sand.

4. Obstacles

4.1 Nature of Off-Street Obstacles

Using static visuals, the instructor will illustrate and describe obstacles to progress encountered in the off-street environment.

(1) General obstacles

- (a) Rocky areas.
  - Creek beds.
  - Rocky trails.
- (b) Logging areas.
- (c) Tall grass, leaves, pine needles--may conceal obstacles such as roots, ruts, rocks, holes, logs.

(d) Construction areas (e.g., new developments under construction); frequently littered with sharp metal, glass, lumber, cinder blocks, etc.

(2) Specific obstacles

(a) Insufficient clearance
- Tires--Rocks so close together as to pinch tires.
- Handlebars--Trees too close together to permit passage.

(b) Insufficient traction
- Extremely slippery areas--Wet boards, moss-covered rocks.
- Off camber surfaces--e.g., rocks inclined across the motorcycle's path.
- Obstacles upon which turns may be made.

(c) Insurmountable obstacles
- Obstacles that exceed the ground clearance of the motorcycle.
- Obstacles that must be struck at a sharp angle rather than head on.

4.2 Surmounting Small Obstacles

The instructor will illustrate and describe procedures for surmounting obstacles ranging up to 4-6 inches in height.

(1) Approaching obstacles

(a) Approach angle
- As close to perpendicular as possible.
- No less than 45°.

(b) Point of contact--select the point that leads to the smallest risk.
- Lowest point.
- Natural ramp (e.g., dirt buildup).
- Logs--bark covered portion to provide rear wheel traction.
- Large rocks--near the center to prevent the rock from tipping under the weight of the motorcycle.

(c) Slow speed
- Minimizes impact.
- Allows quick acceleration to lighten front end.

(d) Low gear--first or second gear to allow quick acceleration.

(2) Immediately prior to impact:

(a) Raise up on footpegs:
  - Helps operator to shift weight rearward (see below).
  - Keeps operator from being bounced off seat on rear wheel impact.

(b) Compress shock absorbers:
  - Lean forward
  - Put weight on handlebars

(c) Lighten front end immediately prior to impact:
  - Accelerate quickly
  - Pull back on handlebars

(d) Maintain straight course:
  - Any turn will cause the motorcycle to lean.
  - Motorcycle leaning on impact may be upset.

(3) Immediately following impact

(a) Close throttle:
  - Cause front end to drop.
  - Allow steering to aid maintaining balance.

5. Hills

The instructor will illustrate and describe procedures for negotiating small hills, e.g., 15%.

5.1 Upgrades

(1) Select course that provides the following:

(a) Straight uphill path; no turns required for rocks, trees, other obstacles.
(b) Firm even surface; avoid ruts caused by erosion.
(c) Firm surface providing good traction (e.g., avoid grass, small pebbles.

(2) Approach speed:

(a) Sufficient momentum to allow hill to be climbed without shifting to low gear.
(b) Downshift may cause wheels to spin, front wheel lift.

(3) Gear selection:

(a) Must allow sufficient approach speed yet enough power to allow speed to be maintained on hill.

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(b) Second gear is generally suitable for small hills.

(4) Stance:

(a) Stand on footpegs.
(b) Leans the body forward upon starting up the incline; helps keep front wheel on the surface as the weight of the motorcycle shifts to the rear wheel.

(5) Maintain Power:

(a) Even a momentary loss of power may cause the motorcycle to slow abruptly.
(b) Once momentum is lost, it is difficult to regain it; engine stalls or rear wheels spin.

(5) Maintain Direction:

(a) Turns tend to result in a loss of speed.
(b) Turn if necessary to keep from stalling.

5.2 Downgrades

(1) Select the safest path; avoid the following:

(a) Surfaces conditions and obstacles described in 5.1 (1).
(b) Lack of sufficient runout at the bottom.

(2) Start downhill at low speed.

(a) Speed should be just sufficient to maintain balance.
(b) Speed reduction may be difficult.
- Excessive braking will cause rear wheel to lock, making steering difficult
- Motorcycle may skid down hill.

(3) Maintain low speed on the downgrade.

(a) Keep the motorcycle in lowest gear to provide engine braking.
(b) Keep throttle closed for engine braking.

    - (c) Maintain a slight pressure on both brakes.

- (4) Stance--sit well back on the seat to improve rear wheel traction.
    - (a) Improves braking.
    - (b) Prevents skidding.

- (5) Maintain straight path--turns may cause a rear wheel skid.

6. Water

6.1 Potential Hazards

The instructor will describe and illustrate, as appropriate, the following potential hazards:

- (1) Sharp objects (e.g., rocks, broken bottles; may cause damage to tires).

- (2) Slippery surfaces (e.g., slime-covered rocks; may cause falls resulting in injury, damage to engine and electrical system).

- (3) Drop-offs and holes; may allow water to enter the air intakes.

6.2 Selecting Crossing Points

- (1) Depth of water
    - (a) Should not be so deep as to submerge air intakes or exhaust pipes (12-18 inches maximum).
    - (b) The operator should be able to see the bottom or be preceded by another rider.
    - (c) If the water is moving, there should be surface ripples.

- (2) Exit
    - (a) The opposite side should provide a gentle incline.
    - (b) A steep incline is difficult to climb if the surface is muddied by frequent motorcycle crossings.

6.3 Negotiating Through Water

(1) Maintain adequate speed (10-15 mph).

  (a) Insufficient speed:
  - May cause loss of momentum, particularly if the bottom is covered with mud.
  - Doesn't deflect water to the sides; may splash engine.
  - May not allow the motorcycle to climb out on the other side.

  (b) Excessive speed:
  - May spray water into the air intake.
  - May spray the rider and those behind.

(2) Body Position

  (a) Novice should remain seated--easier to hold motorcycle up if it starts to fall.

  (b) Experienced rider may stand
  - Better visibility
  - Better control

7. Area Preparation

The instructor will briefly review the following requirements for Practice Area instruction.

(1) Location of meeting place.

(2) Directions to the practice area.

(3) Map of the practice area showing exercise locations.

(4) Requirements for clothing and protective gear.

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MOTORCYCLE SAFETY EDUCATION PROGRAM

UNIT	LESSON	SESSION	TITLE	MODE
V	1	2	Basic Off-Street Operating Skills	Practice Area

PURPOSE

The purpose of this session is to enable students to develop self-confidence and to acquire the basic skills required to negotiate shallow sand, moderate hills, and small obstacles.

CONTENT

This unit consists of the following activities:

1. Trail ride
2. Sand
3. Obstacles
4. Hills

The first exercise is intended to develop interest and confidence by allowing students to operate over a short, easy trail. The remaining exercises follow no set sequence. Two groups of six students will rotate among the three exercise areas, at 15-minute intervals, as assigned by the instructor. Each of the exercises will be performed separately. However, after students have attained a degree of proficiency, the three exercises may be combined into one single exercise. All 12 students would operate along a marked course that included all three exercise areas. The time allocations given in the exercise descriptions include both separate and combined exercise time.

MATERIALS

See Unit Specifications.

EQUIPMENT

See Unit Specifications.

FACILITIES

For this session, the Practice Area utilized during the exercises should meet the following requirements:

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Sand--Up to 2-4 inches in depth.

Obstructions--Up to 4 inches in height.

Hills--Up to 15 % grade.

METHODS

1. Trail Ride 15 minutes

(1) Purpose--The purpose of this exericse is to enable students to develop self-confidence, and to help generate interest in trail riding, by operating over a short, easy trail.

(2) Practice Area Layout--The layout of the exercise area will meet the following requirements:

(a) No greater than one mile in length.
(b) Firm surface, no sand, loose dirt, or gravel deep enough to materially affect the operating characteristics of the motorcycle.
(c) No surface obstacles such as branches, logs, etc. any more than 1 inch in diameter.
(d) No deep ruts or holes deeper than 2-3 inches.
(e) Lateral clearance at least 12 inches on both sides of the handlebars.
(f) No dropoffs and no hills steeper than 10%.

(3) Exercise Procedures--The exercise will be performed using the following procedures:

(a) Up to six students will follow the instructor over the trail segment.
(b) Operating speeds will not exceed 15 mph.
(c) Three-second following distances will be maintained.
(d) The instructor will signal all stops by raising the right hand.

(4) Operating Procedures--The exercise will be carried out using normal motorcycle operating procedures.

(5) Instruction Points--None.

(6) Method--No additional comments.

2. Sand 15 minutes

(1) Purpose--To enable students to develop skill in operating the motorcycle in shallow sand.

(2) Practice Area Layout--This exercise should take place in a sandy area at least 50 feet in length and consisting of sand having a depth of up to 4 inches. A path should be indicated by markers placed at the entry and exit points from the sand. If possible, two paths approximately 15 feet apart should be used to allow two motorcycles to negotiate sand at the same time.

(3) Exercise Procedures--The exercise will consist of the following activities:

(a) Students will enter the sand next to one marker and maintain a straight course to the marker at the far end of the sand.
(b) One student will not enter the sand until the preceding student has exited or until signalled by the instructor.
(c) Any student who stalls or falls in the sand will push the motorcycle out of th pathway to permit the next motorcycle to start.

(4) Operating Procedures--The exercise will be performed using the following procedures:

(a) Rise on pegs and shift weight back before entering sandy area.
(b) Enter at moderate speed and in low gear.
(c) Maintain speed through the sandy area.
(d) Allow the motorcycle to wander; avoid "fighting" the handlebars.

(5) Instruction Points--The instructor should observe the student for the following errors:

(a) Entering without sufficient speed.
(b) Failing to maintain speed.
(c) Remaining seated.
(d) Failing to shift the weight back.
(e) Looking down rather than ahead.

(6) Method--If the sand varies in depth, the exercise should start in shallow areas and progress to paths involving areas of greater depth.

3. Obstacles 15 minutes

(1) Purpose--The purpose of this exercise is to enable students to surmount all obstacles across the trail.

(2) Practice Area Layout--The layout of the practice area for this exercise will include the following:

(a) A path laid out, with the aid of markers, configured so as to expose the student to as many of the following obstacles as follows:
   - Holes, small ditches, small rises and dropoffs.
   - Branches, small logs, and/or flat rocks laid across the path.

(b) None of these obstacles should exceed 4 inches in height.
(c) A firm surface between obstacles.
(d) Configured to form a circuit so that students may operate continuously along the path.
(e) A minimum separation of 15 feet between segments of the path.

(3) Exercise Procedures

(a) Students will operate along the prescribed path maintaining a distance separation of at least three seconds.
(b) The first few times around the path, all obstacles will be placed perpendicular to the motorcycle's path.
After students have demonstrated their ability to handle the obstacles successfully, they will be re-oriented so as to require that the operator surmount them at angles up to 30 degrees.
(c) Students who have not participated in obstacle surmounting during Unit III (i.e., students not enrolled in the Comprehensive Course) should be provided an opportunity to practice standing on the pegs as well as coordinating acceleration and weight shift using small obstacles (e.g., two inches in height) before attempting the path that has been described.

(4) Operating Procedures--The exercise will be performed using the following procedures:

(a) Approach at low speed in low gear (first or second)
(b) Rise on footpegs, weight forward to compress shock absorbers.
(c) Maintain straight path.
(d) Just before impact, open throttle and shift weight back rapidly.
(e) Close throttle as the front tire surmounts the obstacle.

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(5) Instruction Points--The instructor will observe the students for the following errors:

(a) Failure to shift weight forward on approach (shock absorbers are not compressed).
(b) Remaining seated as the motorcycle surmounts the obstacle.
(c) Failure to open throttle and shift the weight back.
(d) Failure to close the throttle immediately upon surmounting the obstacle.

(6) Method--The instructor will demonstrate proper obstacle surmounting technique using several of the obstacles placed along the path. He will then make one complete circuit of the path while students observe from a stationary position.

Following the instructor demonstration, students will operate along the path while the instructor observes.

4. Hills 15 minutes

(1) Purpose--The purpose of this exercise is to enable students to safely ascend and descend gentle hills.

(2) Practice Area Layout--This exercise requires a hill approximately 10-30 feet in length with a grade of about 15%.

If a hill having a width of 30 feet or more can be found, uphill and downhill paths may be placed side by side to permit continuous operation by students. Two sets of markers should be placed at the top and bottom of the hill to indicate uphill and downhill paths. They should be placed so as to maintain a 20-foot separation between the two paths.

(3) Exercise Procedures--The exercise should be performed using the following procedures:

(a) In ascending the hill, students will approach the marker at the foot of the hill and ride directly to the top; students descending the hill will approach the marker at the top and proceed directly to the bottom.

(b) Where uphill and down hill paths are placed side by side, students should operate continuously in a circuit. Upon reaching the top of the hill, they should turn and approach the downhill path; similarly, upon reaching the bottom, they should turn and approach the uphill path.

(c) Where only one path is available, students will proceed one by one to the top. All will then turn around, and proceed one by one to the bottom.

(d) Regardless of the layout, no student will start uphill or downhill until the path is clear; no two students will operate on the same incline at the same time.

(e) Any student who stalls on the incline willback and turn to the left across the hill, then turn right and proceed downhill. No attempt should be made to accelerate the motorcycle on the hill once it has stalled.

(4) Operating Procedures--Students will perform the exercise using the following procedures:

Uphill

(a) Approach the hill in the proper gear (generally second) at sufficient speed to reach the top without downshifting.

(b) Stand on the footpegs with the body inclined forward.

(c) Maintain a straight line and constant speed.

(d) Close the throttle upon reaching the crest of the hill.

Downhill

(a) Approach at low speed in the proper gear (generally second).

(b) Maintain slight pressure on both brakes.

(c) Sit well back on the seat.

(5) Instruction Points--The instructor will observe for the following errors:

(a) Approaching the incline at the wrong speed or in the wrong gear.

(b) Failure to distribute weight appropriately (i.e., sitting squarely in the seat).

(c) Spinning the rear wheel while going uphill,or locking it coming downhill.

(d) Failure to close the throttle at the top of the hill.

(e) Failure to look well ahead (i.e., looking directly in front of the motorcycle).

(6) Method--The instructor will provide at least two demonstrations of uphill and downhill operation, after which students will take turns ascending and descending the hill. Instructor should be positioned near the top in order to observe students and render assistance to those who stall or fall.

MOTORCYCLE SAFETY EDUCATION PROGRAM

UNIT	LESSON	SESSION	TITLE	MODE
V	1	3	Basic Trail Riding	Trail

PURPOSE

The purpose of this session is to allow students to apply basic trail riding principles, and develop basic trail riding skills, both within an actual trail environment.

CONTENT

This session is designed to permit students to continue,within a trail environment, to develop those skills acquired during Practice Area instruction. The trail would be selected so as to confront students with conditions calling for application of the full range skills previously acquired, yet not demand levels of proficiency beyond those possessed by students on the basis of Practice Area instruction.

MATERIALS

Student Materials

In addition to the general requirements set forth in Unit Specifications, the following specific student materials are required for this session:

1. Route Guidance

   (a) A map of the trail area that may be used to:
   - Brief the lead student on the course to be taken.
   - Assist anyone separated from the group in rejoining it.

   (b) Street map--A regular or specially prepared street map of the area surrounding the trail, to be used to:
   - Assist students in finding the location of the trail ride.
   - Enable students who become lost or otherwise separated from the group to find their way home.

2. Trail Riding Rules--General rules for trail riding including the following:

   (a) Hand, horn, or other signals used by instructors to communicate the following:
   - Stop immediately (e.g., trouble ahead).
   - Stop at the next convenient spot (e.g., rest, change positions).
   - Close up the formation (e.g., lagging students).

(b) Procedures to be used in the event of any of the following emergencies:
- Equipment breakdown.
- Becoming lost.
- Injury.

Teacher Materials

See Unit Specifications.

EQUIPMENT

In addition to requirements set forth in the Unit Specifications, each instructor should bring a 25-foot length of rope to be used in pulling disabled motorcycles.

FACILITIES

This session requires a trail consisting of a clearly delineated path, up to several miles in length, having as many of the following characteristics as possible:

(a) Sand--Short, sandy segments with sand up to 4 inches in depth; no deep sand.

(b) Surface Obstructions--A few obstructions up to 4 inches in height; no objects exceeding the motorcycle's ground clearance and no areas requiring continuous operation over obstacles (e.g., rocky river beds, heavily eroded surfaces, deep ruts).

(c) Hills--Inclines up to 15% grade having firm surfaces and clear of obstacles.

(d) Sight/Maneuver Limitations--Woods, large rocks, etc. creating both sight and maneuver limitations. The lateral clearance between obstacles should allow 12 inches clearance on either side of the motorcycle's handlebars.

(e) Water--Narrow and shallow (up to 4 inches) creeks or brooks. The under-water surface must be relatively firm and clear of rocks or debris.

METHOD

(1) Purpose--Same as Session purpose.

(2) Route Requirements--Routes through the selected facility should be chosen so as to expose students to the widest range of conditions. In designating routes, the following requirements should be imposed:

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(a) Operation on public highways should be minimized(it is alright to cross them).
(b) Preserved areas and ground under cultivation should be avoided.
(c) Difficult conditions should be encountered toward the middle of the route rather than at the beginning or end.

(3) Exercise Procedures--The exercise will be performed using the following procedures:

(a) An instructor and three students will proceed in single file along the trail.
(b) A student will occupy the lead position and will be followed immediately by the instructor.

(c) Approximately every ten minutes, the formation will stop to allow the instructor to:
- Critique the lead student.
- Answer any questions.
- Rotate students among positions.

(4) Operating Procedures--The following items should be stressed and used to guide the lead student critique:

(a) Sight Limitations--Speed will be reduced where sight distance is limited by trees, hills, and embankments, or vegetation.
(b) Operating Procedures-- Operating procedures taught in Sessions V-1-1 and V-2-2 will be used in handling the following off-street situations:
- Sand
- Hills
- Obstacles
- Water

(5) Instruction Points-- Student should be observed for those errors identified in connection with specific off-street environmental characteristics during Practice Area instruction (V-1-2).

(6) Method--In addition to general instruction methods described in Course specifications the following techniques will be employed:

(a) Preparation--The instructor will undertake the following activities in preparation for the trail riding session:

- Scout the selected route in advance. This should be done shortly before the scheduled session in order that the instructor will be aware of any recent changes in trail conditions (e.g., fallen trees, muddy areas).
- Review the proposed route with students, using provided maps.

(b) Control and Observation--The instructor will adopt the following techniques in observing and exercising control over students:

- Generally operate in the second position in order to be able to observe both the lead student and the path ahead.
- Upon approaching areas where particular maneuvers are to be performed (hills, obstacles, water, etc.) take up an advanced position so as to observe each student carry out the maneuver.
- Where the lead position is taken by a proficient student, drop back one position in order to be able to observe and critique a less proficient student.
- Utilize radio communication equipment, if available, to give immediate feedback to the lead student and draw attention of other students to correct any incorrect performances.

(c) Navigation--To provide for practice in navigation, the following procedures will be adopted:

- The lead student will be responsible for following the correct course and for marking any unclear choice points.
- All students will be required to follow the course on a map so as to be aware of their location at any time.

(d) Stops--In addition to any periodic stops that are required for critique of the lead student, additional stops should be called for as follows:

- Rest stops should be scheduled approximately every 20 minutes or after a particularly demanding segment of the trail has been negotiated.
- At any stop, students shold be queried as to their present location, as indicated on the area map.
- A critique or instructor demonstration may be provided wherever particularly notable conditions are encountered.
- If a student fails to show up at a stop point, or if the instructor notices the absence of a student, the formation will remain in place while the instructor backtracks to find the student.
- During one of the rest stops, the instructor will demonstrate the process of towing a disabled motorcycle.

MOTORCYCLE SAFETY EDUCATION PROGRAM

UNIT	LESSON	TITLE
V	2	Intermediate Off-Street Operation

PURPOSE

The purpose of this lesson is to enable students to develop the skills needed to cope with the more demanding aspects of a normal off-street operating environment.

OBJECTIVES

Performance Objectives	Knowledge and Skill Objectives
HILLS	
The student must be able to climb and descend steep hills.	The student must be able to adjust body position, acceleration, braking, and gear selection to control speed and balance on steep upgrades and downgrades.
The student must be able to control, reposition, and restart the motorcycle in the event of an engine stall on a steep upgrade.	
The student must be able to start the engine on, negotiate, and turn uphill or downhill from, an off-camber surface.	
OBSTACLES	
The student must be able to surmount obstacles whose height exceeds the ground clearance of the motorcycle.	The student must know the conditions of speed, obstacle height, gradient, surface condition, and approach angle permitting the motorcycle to surmount large obstacles. The student must coordinate throttle and weight distribution in order to maintain the front wheel in an elevated position until the rear wheel has climbed an obstacle.

Performance Objectives	Knowledge and Skill Objectives
HEAVY SAND	
The student must be able to operate in heavy sand.	The student must be able to regulate throttle, gear shift, and weight distribution in order to lighten the front end and maintain traction and momentum when operating in heavy sand.
The student must be able to dismount, push the motorcycle, and remount when the engine is in danger of stalling in heavy sand.	
MUD	
The student must be able to operate the motorcycle in mud.	The student must be able to adjust steering, throttle control, use of the clutch, gear selection, and weight distribution so as to maintain speed and direction in mud.
DEEP WATER	
The student must be able to operate the motorcycle in deep water.	The student must be able to regulate throttle, clutch, gear shift, and body weight distribution so as to maintain speed, direction, and balance when operating in deep water.

MOTORCYCLE SAFETY EDUCATION PROGRAM

UNIT	LESSON	SESSION	TITLE	MODE
V	2	1	Intermediate Off-Street Operating Principles	Classroom

PURPOSE

The purpose of this session is to communicate to students the hazards created by, and procedures for coping with, the more demanding characteristics of the off-street environment.

CONTENT

This session consists of the following topics:

1. Steep hills
2. Side slopes
3. Large obstacles
4. Deep sand
5. Mud
6. Range preparation

This session focuses upon the procedural components of the higher level skills needed to cope with the more demanding terrain features that were excluded from Lesson 1.

MATERIALS

Student Materials

See Unit specifications.

Teacher Materials

See Unit specifications.

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Instructional Aids

Instructional aids required in support of session instruction include the following:

(1) Static or dynamic visual aids illustrating the following:

  (a) Recovering from a stall on a steep hill.
  (b) Negotiating side slopes.

(2) Dynamic visual aids demonstrating procedures for handling the following:

  (a) Maintaining speed and recovering from elevation of the front wheel on a steep upgrade.
  (b) Lofting over large obstacles.
  (c) Operating in deep sand, including dismounting, pushing, and remounting while maintaining momentum.
  (d) Operating in mud.

FACILITIES

See Course specifications.

METHODS

1. Steep Hills

1.1 Problems Created by Steep Hills

(1) Upgrades.

(a) Maintaining speed--The greater the incline, the more precise must be the coordination of throttle, clutch, gear shift.
(b) Stalls--The steeper the incline, the more likely the engine is to stall.
(c) Front wheel contact--The steeper the incline, the more likely the front wheel is to come off the surface during acceleration or when striking an object.

(2) Downgrades.

(a) Braking--Rear wheel braking is more likely to result in a skid because of:
- Increased gravitational force.
- Increased forward weight shift.

1.2 Maintaining Speed on Upgrades

Using dynamic visuals, the instructor will illustrate and describe procedures for maintaining speed on an upgrade.

(1) Approaching steep grades--Choice of path, gear selection, and speed more critical on steeper upgrades.

(2) Loss of power--If engine speed begins to fall:

(a) Downshift as soon as RPMs begin to drop; if the engine begins to lug, speed recovery may not be possible.
(b) Downshift quickly.
- The motorcycle will lose speed quickly between gears.
- It may be necessary to downshift without using the clutch.

(3) Rear Wheel Spin--Reduce power by one of the following:

(a) Relax throttle.
(b) Upshift, if possible, to increase speed.
(c) Slip the clutch if upshifting would result in a stall.

1.3 Recovering from a Stall

Using static or dynamic visuals, the instructor will demonstate and describe procedures for recovering from an engine stall on an upgrade.

(1) Controlling Position

(a) Front brake.

- Use the front brake to control backward roll if the gradient and surface will permit.
- Shift into neutral.

(b) Front brake and clutch.

- If the grade is too steep or traction insufficient, use the transmission as well as the front brake to maintain position.
- Regulate the front brake and clutch to control backward roll.

(2) Turning the Motorcycle Crosswise to the Hill.

(a) Regulate the front brake or brake and clutch so as to allow the motorcycle to roll slowly backward.

(b) Turn the handlebars away from the side that the kickstarter is mounted on.

- This will cause the motorcycle to turn so that the kickstand is on the downhill side.
- Havin the kickstand on the downhill side allows the rider to use the uphill leg to support the motorcycle.

(c) Lean the motorcycle toward the hill as it turns.

(d) Squeeze the clutch lever for starting.

(3) Continuing up or down hill.

(a) Uphill

- If grade and surface will permit, the motorcycle can continue uphill.
- It is best to start across the slope and gradually turn uphill.

(b) Downhill--If unable to get moving uphill, turn the motorcycle down hill and proceed to the bottom to restart.

1.4 Elevation of Front Wheel

Using dynamic visual aids, the instructor will illustrate and discuss procedures for recovering from elevation of the front wheel on a steep slope.

(1) Maintaining front wheel contact.

(a) Keep weight forward.
(b) Avoid sudden acceleration.
(c) Apply power gradually in a downshift.
  - Open throttle gradually.
  - Slip clutch if necessary.

(2) If the front wheel begins to rise:

(a) Shift weight forward.
(b) Close the throttle.
(c) Upshift or slip the clutch in order to prevent recurrence.

(3) If the front wheel rises sharply:

(a) Close the throttle.
(b) Squeeze the clutch.
(c) Tap the foot brake.

(4) If the motorcycle begins to fall over backwards:

(a) Close the throttle and shut off "kill switch."
  - Helps to keep the rear wheels from running uphill and flipping the motorcycle over backward.
  - Closing the throttle may stall the engine; turning off the kill switch is surer if it can be done.
(b) Dismount and put both feet on the ground behind the motorcycle.
(c) Turn the motorcycle across the hill if possible.
  - Hold the handlebars tightly.
  - Turn the motorcycle 90° to the hill.
  - Use the front brake to stop the motorcycle.
  - If the motorcycle flips over backward, push the handlebars to one side and move quickly in the opposite direction.

1.5 Steep Downgrades

Using dynamic visuals, the instructor will illustrate and discuss procedures for handling steep downgrades.

(1) Maintaining traction.

(a) Keep the transmission in first gear.
(b) Sit well back on the seat to maximize rear wheel traction.
(c) Apply both brakes.

(2) If traction cannot be maintained:

(a) Stall the engine to provide engine braking.
(b) Allow the rear wheel to lockup (from engine braking).
(c) Use the feet for support; concentrate on keeping the motorcycle in a straight path downhill.

2. Side Slopes

Using static or dynamic visuals, the instructor will illustrate procedures for negotiating side slopes.

2.1 Operating Across Side Slopes

(1) Avoid side slopes when traction is poor (e.g., dry grass).

(2) Lean body toward hill to keep the angle of the wheel to the slope as close to 90° as possible.

(3) Use light rear brake pressure when stopping; locking up the rear wheel may cause a downhill slide.

2.2 Turning

(1) Make uphill turns gradually; sharp turns may result in a loss of speed.

(2) Make downhill turns by leaning away from the turn.

2.3 Starting on a Side Slope

(1) See that the kickstarter is on the downhill side, if possible, so that the uphill leg may be used to hold the motorcycle upright.

(2) If it is necessary to start the engine with the kickstarter on the uphill side, it may be necessary to dismount to use the kickstarter.

3. Large obstacles

Using dynamic visuals, the instructor will illustrate "lofting" over large obstacles.

3.1 Nature of Lofting

(1) Allows the motorcycle to surmount obstacles that exceed the ground clearance of the motorcycle (illustrate obtstacles).

(2) Accomplish by maintaining the front wheel in an elevated position while the rear wheel surmounts the obstacle (illustrate).

3.2 Lofting Procedure

(1) Review critical elements of surmounting.

  (a) Approach with motorcycle straight up.
  (b) Select portion of obstacle with good traction.
  (c) Stand on pegs.
  (d) Lean forward to compress shock absorbers.
  (e) Lean back and open throttle just before impact.
  (f) Close throttle as front end surmounts obstacle.

(2) Lofting Procedure

  (a) Same as surmounting except that throttle is maintained in open position after front wheel surmounts the obstacle.
    - Keeps the front wheel elevated as the rear wheel surmounts the obstacle.
    - Prevents the frame from striking the obstacle.
  (b) Must approach the obstacle from 90° angle.

(3) Lofting where surface is firm.

  (a) May close the throttle as soon as the rear wheel makes contact with the obstacle.
  (b) Drops the front end so that the front wheel strikes first.

(4) Lofting where surface is soft or obstructed.

  (a) Maintain open throttle as rear wheel climbs the obstacle.
  (b) Keeps the front end elevated while the rear wheel surmounts the obstacle.
  (c) Causes the rear wheel to contact the ground first.
  (d) Prevents the front wheel from burying into the surface.
  (e) Often called "jumping" an obstacle.

(5) Potential hazard.

  (a) Excessive throttle may cause the motorcycle to flip over backwards.
  (b) Should begin with gentle lofting; gradually increase duration of front wheel elevation.
  (c) Too little throttle after lofting may result in the front wheel hitting first.

4. DEEP SAND

Using dynamic visuals, the instructor will illustrate and describe the procedures for operating the motorcycle through deep sand.

4.1 Maintaining Speed

(1) Review procedures for operating in sand.

  (a) Keep momentum.
  (b) Stand on pegs with weight well back.
  (c) Allow the motorcycle to weave back and forth.
  (d) Make direction changes gradually if at all.

(2) The deeper the sand,

  (a) The faster the motorcycle must go.
  (b) The further back the weight must be transferred.

4.2 Getting Started in Deep Sand

(1) Keep weight well back.

(2) Vary throttle.

  (a) Open throttle to start motorcycle moving.
  (b) Back off as soon as the rear wheel begins to spin.
  (c) Keep repeating the process until the motorcycle attains adequate speed.

4.3 Pushing the Motorcycle

(1) If the rear wheel begins to spin and the motorcycle starts to lose speed:

  (a) Jump off the motorcycle without stopping.
  (b) Maintain a grip on both handlebars.
  (c) Keep the throttle open.
  (d) Push the motorcycle to keep it going.

(2) When the motorcycle gains sufficient speed:

  (a) Place the left foot on the footpeg.
  (b) Swing the right leg over the seat.

(3) Do not try to "duckwalk."

  (a) Keeps weight on the motorcycle, causing it to sink into the sand.
  (b) Too fatiguing.

5. Mud

Using dynamic visuals, the instructor will describe the procedures for operating through mud.

5.1 General Procedures

(1) Operate at the slowest possible speed without losing headway; the higher the speed, the greater the likelihood of a fall.

(2) Keep in the highest gear possible without lugging the engine.

  (a) Limits power to the rear wheel.
  (b) Lessens the chances of spinning the rear wheel.

(3) Remain seated in order to allow the feet to be used to hold the motorcycle upright if such becomes necessary.

5.2 Special Problems

(1) Rear wheel spin.

  (a) Spinning rear wheel may dig a hole and cause the motorcycle to become mired.
  (b) Shift to a higher gear in order to reduce power to the rear wheel.

(2) Engine lugging.

  (a) Downshift, applying power gradually.
  (b) Slip the clutch if necessary.

(3) Clogged wheels.

  (a) Mud frequently builds up between the tire and the fender, locking the wheels.
  (b) A laboring engine is a symptom of accumulating mud.
  (c) If wheels become clogged:
    - Leave the muddy area if possible; operating at high speed over a firm surface will clean the tires.
    - If it is not possible to leave the muddy area, stop and clean out the mud with a screwdriver or stick of wood.

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6. Practice Area Preparation

The instructor will provide directions to the location of the Practice Area site if it is different from that used for Session V-1-2.

MOTORCYCLE SAFETY EDUCATION PROGRAM

UNIT	LESSON	SESSION	TITLE	MODE
V	2	2	Intermediate Off-Street Operating Skills	Practice Area

PURPOSE

The purpose of this session is to enable students to cope safely with the more demanding characteristics of the off-street environment.

CONTENT

This session consists of the following topics:

1. Steep hills
2. Side slopes
3. Large obtstacles
4. Deep sand
5. Mud

Two groups of six students will rotate among the five exercise areas. Initially, each exercise will be performed separately. However, after students have attained a degree of proficiency, they may be combined into a single exercise, with all twelve students operating along a marked course that includes the five exercise areas. The time allocations that are given in exercise descriptions include the total time given to the activity both in separate and combined exercises.

MATERIALS

See Unit specifications.

EQUIPMENT

See Unit specifications.

FACILITIES

For this session, the Practice Area utilized during the exercises should meet the following requirements:

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Hills--Grades up to 30%.

Side slopes--Slopes of up to 15% grade that are wide enough to be traversed.

Obstacles--Logs, dropoffs, rocks, etc. up to 12 inches in height.

Mud--Up to 4-6 inches depth.

Sand--Up to 6 inches in depth; sections should be up to 100 feet long if possible.

METHOD

1. Steep Hills 15 minutes

1.1 Recovering from a Stall

(1) Purpose--The purpose of this exercise is to enable students to recover from a stall occurring during a climb up a steep hill. This activity is scheduled to occur before Exercise 1.2, Climbing and Descending Steep Hills, in order that students will be prepared to handle any stall that might occur during that exercise.

(2) Practice Area Layout--This exercise requires a hill approximately 20-50 feet in length with a grade of about 30%. If the hill is sufficiently wide, two students may perform the exercise at the same time. In such a situation, a 20' separation should be maintained between the two students.

(3) Exercise Procedure--The exercise will be performed using the following procedures:

(a) Students should approach the hill, climb to a point indicated by the instructor (approximately 10-15 feet up the hill), bring the motorcycle to a stop, and turn off the engine.
(b) After stopping, students will turn the motorcycle crossways to the slope, re-start the engine and proceed to the bottom of the hill.
(c) Each pair of students will wait until the previous pair has reached the bottom before starting up the hill.
(d) Students who fail to perform correctly the first time will be given up to two additional trials.

(4) Operating Procedures--Students will perform the exercise using the following procedures:

(a) Using the front brake to maintain position, squeeze the clutch lever to disengage the engine and allow the motorcycle to move freely.
(b) By adjusting the front brake, allow the motorcycle to roll back slowly.
(c) Rotate the handlebars so that the motorcycle turns crosswise to the slope with the kickstarter on the downside.
(d) Turn the ignition or killswitch on and start the engine.
(e) Turn and start downhill, shifting into first gear immediately.

(5) Instruction Points--The instructor will observe the students for the following errors:

(a) Attempting to shift to neutral rather than using the clutch to disengage the engine,
or to dismount, in order to work the shift lever.
(b) Failure to shift into first gear after starting downhill.

(6) Method--The instructor should provide one demonstration before students begin to practice. Students who fail to perform the activity correctly after three trials should be directed to an unused portion of the hill to practice further while the remaining students proceed to Exercise 1.2.

1.2 Climbing and Descending Steep Hills

(1) Purpose--The purpose of this exercise is to enable students to climb and descend hills having a grade of up to 30%.

(2) Practice Area Layout--This exercise requires a hill approximately 20-50 feet in length, with a grade of approximately 15%. If the hill is sufficiently wide, uphill and downhill paths may be placed side by side to permit continuous operation by students. Two sets of markers should be placed at the top and bottom of the hill to indicate uphill and downhill paths. There should be a minimum of 20-foot separation between the two paths.

(3) Exercise Procedures--This exercise should be performed in the same manner as Exercise 4 in Unit V-2-1, except that students who stall should turn around, as described in Exercise 1.1, rather than backing to the bottom of the hill.

(4) Operating Procedures--Students will perform the exercise using the following operating procedures:

(a) Approach the hill in the proper gear at the maximum speed that can be safely carried on to the upgrade (as determined by the instructor).
(b) Stand on the footpegs with the body inclined forward.
(c) Maintain a straight course.
(d) Downshift quickly if engine speed begins to drop.
(e) Relax the throttle slightly if the rear wheel begins to spin; shift weight to the rear if necessary.

Downhill

(a) Put the motorcycle in first gear.
(b) Sit well back on the seat.
(c) Brake gently with both brakes.

(5) Instruction Points--The instructor should observe students for the following errors:

Uphill

(a) Failure to shift weight far enough forward.
(b) Approaching the hill with insufficient speed or in the right gear.
(c) Failure to downshift soon enough or rapidly enough.

Downhill

(a) Failure to move weight far enough back to maintain traction.
(b) Failure to brake sufficiently, allowing the motorcycle to gain too much speed.

(6) Method--The instructor will provide two demonstrations of uphill and downhill operation, showing how the motorcycle can be kept under control despite the steep pitch.

2. Side Slopes 10 minutes

(1) Purpose--The purpose of this exercise is to enable students to traverse, and turn uphill or downhill from, a slide slope.

(2) Practice Area Layout--This exercise requires a gentle slope (up to 15%) that is wide enough to be traversed. The surface should be relatively firm and offer good traction (no sand or dry grass).

(3) Exercise Procedures--This activity will be performed using the following procedures:

(a) Enter the side slope either directly from the side or from a downhill approach.
(b) Traverse the slope, turning downhill at a point indicated by the instructor.
(c) Enter the slope from the opposite direction, traverse, and turn down hill at a point designated by the instructor.
(d) Repeat the above procedure several times with downhill exits and then several more times with an uphill exit.

(4) Operating Procedures--Students will perform the exercise using the following operating procedures:

(a) Avoid sudden acceleration or braking while traversing.
(b) Make turns as described in V-2-1.

(5) Instruction Points--The instructor will observe students for the following errors:

(a) Locking or spinning the rear wheel and losing traction.

(6) Method--The instructor should provide a demonstration of both operating procedures and the path to be followed prior to student practice of each activity (i.e., traverse with downhill exit, traverse with uphill exit).

3. Large Obstacles 15 minutes

(1) Purpose--The purpose of this exercise is to enable students to safely surmount obstacles whose height exceeds the ground clearance of the motorcycle.

(2) Practice Area Layout--The layout of the Practice Area for this exercise will include the following:

(a) A path laid out with markers configured to require the students to surmount dropoffs, ruts, holes, logs, large rocks, or other natural obstacles up to 12" in height.
(b) The surface at the point where obstacles are to be surmounted should be firm.
(c) The path should form a circuit so that students may operate continuously.
(d) There must be a minimum separation of 15 feet between any adjacent segments of the path.

(3) Exercise Procedures--This exercise will be performed using the following procedures:

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(a) Students will operate along the prescribed path, maintaining a following distance of at least three seconds.
(b) Initially, students will circumvent any obstacles that actually exceed the ground clearance of the motorcycle, and practice lofting procedures over small obstacles.
(c) As students gain proficiency in the lofting procedure, the instructor will permit them to surmount larger obstacles. Students will not be asked to surmount large obstacles unless they feel capable of doing so.

(4) Operating Procedures--The exercise will be performed using the following procedures:

(a) Approach the obstacle at a perpendicular angle and in a straight line.
(b) Stand on the pegs.
(c) Lean forward to compress the shock absorbers.
(d) Lean back and open the throttle just before impact.
(e) Keep the throttle open as the rear wheel surmounts the obstacle.
(f) Gradually increase the time during which the throttle is held open to cause the rear wheel to strike the ground first.

(5) Instruction Points--The instructor will observe the students for the following errors:

(a) Failure to lean forward and compress shock absorbers before reaching the obstacle.
(b) Failure to keep the throttle open long enough to maintain the front wheel in an elevated position.

(6) Method--The instructor will demonstrate proper lofting technique using several of the obstacles along the path. He will then make one complete circuit of the path surmounting those obstacles that students are to attempt in their initial trials.

Following the instructor demonstration, students will operate along the designated path while the instructor observes. As students develop the necessary proficiency, instructor will direct them to the larger obstacles.

Students should be advised to stop and take a short rest when they are tired. Instructor should watch for students who appear to be tiring.

4. Deep Sand 10 minutes

(1) Purpose--The purpose of this exercise is to enable students to maintain speed when operating in deep sand.

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(2) Practice Area Layout--This exercise requires a stretch of sand up to 100 feet in length and ranging from 4 - 6 inches in depth. Students would take turns operating through the sand. No student should enter the exercise area until the preceding student ha left it.

(3) Exercise Procedures-- This exercise should consist of the following activities:

(a) Students should take turns operating across the stretch of deep sand.

(b) During initial trials, students should attempt to maintain momentum through the sand.

(c) Students who are able to maintain momentum would be asked to allow the motorcycle to lose speed, jump off, push it and remount it.

(d) Students who are able to push the motorcycle will be asked to stop the motorcycle in the sand and get it moving again.

(4) Operating Procedures--Students will perform the exercise using the following procedures:

(a) Enter the sand at moderate speed in correct gear with weight well back on the seat.
(b) Maintain a constant speed through the sand.
(c) If the motorcycle begins to slow down, dismount, push the motorcycle, and remount when sufficient speed is attained.
(d) If the motorcycle comes to a stop, get it moving by varying the throttle so as to accelerate the motorcycle without causing rear wheel spin.

(5) Instruction Points--The instructor will observe for the following student errors:

(a) Entering the sand at too slow a speed , in wrong gear, or with weight too far forward.
(b) Slowing down as resistance is encountered.
(c) Allowing the motorcycle to come to a stop, with the rear wheel digging a hole before getting off and pushing.
(d) Excessive spinning of the rear wheel when attempting to get the motorcycle started.
(e) Attempting to "duck walk" rather than push the motorcycle.

(6) Method--The instructor will demonstrate the following:

(a) Maintaining momentum by operating in the correct speed and gear.
(b) Dismounting, pushing, and remounting after the motorcycle has been allowed to lose momentum.
(c) Starting the motorcycle in deep sand by varying throttle application.

Pushing the motorcycle in deep sand involves a great deal of physical exertion and should not be attempted by students who are not in good physical condition. Also, while the period of time between trials should allow a brief respite, the instructor should be alert to students who are fatigued.

5. Mud 10 minutes

(1) Purpose--The purpose of this exercise is to enable students to maintain balance when operating in mud.

(2) Practice Area Layout--This exercise may take place wherever mud can be found, including clay or dirt after rain or thaw, exit points from streams (which will get muddier as students use it), or a dirt surface upon which water has been sprayed or poured.

(3) Exercise Procedures--This exercise simply requires students to negotiate muddy section without falling. Students should take turns. No student should enter the muddy area until the other student has left it and is on firm ground again.

(4) Operating Procedures--The students will perform the exercise using the following procedures:

(a) Operate at the slowest possible speed without losing headway.
(b) Keep the motorcycle in the highest gear possible without lugging the engine.
(c) Remain seated, prepared to use the feet to maintain balance if such becomes necessary.

(5) Instruction Points--The instructor will observe students for the following errors:

(a) Excessive throttle, resulting in rear wheel spin.
(b) Sudden acceleration after downshifting, causing rear wheel spin.

(6) Method--Since this activity is inclined to be messy, it should be performed close to the end of the session by each group. The instructor will demonstrate the procedure 2 or 3 times to help students identify appropriate entry speed and gear.

Operation of student motorcycles over hard ground between each trial should clear the tires of accumulated mud. However, the instructor should be alert to the buildup of mud and instruct students to remove the accumulation either by riding at high speed over a hard surface or with the aid of a screwdriver from the tool kit.

NOTE: Upon completion of this session, students should be required to wash accumulated mud and sand from the motorcycle and to lubricate the chain and cables.

MOTORCYCLE SAFETY EDUCATION PROGRAM

UNIT	LESSON	SESSION	TITLE	MODE
V	2	3	Intermediate Trail Riding	Trail

PURPOSE

The purpose of this session is to allow students to develop the ability to cope with the more demanding aspects of off-street riding within an actual trail environment.

CONTENT

This session is designed to permit students to continue, within a trail environment, to develop those skills acquired during Practice Area instruction of V-2-2. The trail would be selected so as to confront students with conditions calling for application of the full range of skills previously acquired, yet not demand levels of proficiency beyond those attained by students on the basis of Practice Area instruction.

MATERIALS

Materials required in support of instruction in this session are limited to those identified under "Route Guidance" in Session V-1-3.

EQUIPMENT

In addition to requirements set forth in the Unit specifications, the instructor should bring a 50-foot length of rope to be used in pulling disabled motorcycles.

FACILITIES

This session requires a trail consisting of a clearly delineated path that is up to several miles in length, having as many of the following characteristics as possible:

(a) Hills up to 50 feet in length and 30% grade--
Hills of maximum grade and length should have a fairly firm, clear surface. Hills of lesser length and gradient may offer sections where traction is reduced (e.g., loose gravel), or where small obstacles must be traversed (e.g., roots, erosion).

(b) Surface obstructions--Surface obstructions up to 12 inches in height (e.g., dropoffs, logs, large rocks, mudholes). Those exceeding six inches in height should be capable of being circumvented by less proficient students.

(c) Side slopes--Gentle side slopes (up to 15%) that are traversed as part of the trail. The surface should offer a firm footing.

(d) Sand--Sandy areas up to 6 inches along straight portions of the trail and 4 inches at turns in the trail.

(e) Mud--Muddy sections up to 4-6 inches in depth along level portions of the trail.

(f) Water--Shallow creeks or brooks up to 12 inches in depth. The underwater surface must be relatively firm and clear of rocks or debris.

METHOD

(1) Purpose--Same as Session purpose.

(2) Route Requirements--The same requirements set forth in Session V-1-3 relative to range of conditions and operation over public highways and in preserved areas must be observed.

(3) Exercise Procedures--Same as Session V-1-3.

(4) Operating Procedures--The operating procedures taught in Sessions V-2-1, and V-2-2, will be used in handling steep hills, side slopes, obstacles, sand, and mud.

(5) Instruction Points--The instructor will observe the lead student for errors identified in connection with specific off-street environmental conditions in Practice Area instruction (Session V-2-2).

(6) Method--See Session V-1-3.

UNIT VI. PREPARATION FOR TRAVEL

PURPOSE

The purpose of this Unit is to assure that students prepare themselves and their motorcycles appropriately for safe operation in any selected environment.

CONTENT

This Unit comprises two lessons, each consisting of a single classroom session. The lessons and sessions are as follows:

Session 1 - General Preparation for Travel
Session 2 - Preparation for Off-Street Travel

In chronology, activities described in this unit would take place prior to operation of a motorcycle. It is delayed until initial operating instruction is completed in order to allow such instruction to start immediately and to give the instruction more meaning by allowing it to be related to operating experiences. It is removed from the sequence of operating instruction and treated as a separate unit in order that it may be inserted anywhere in the schedule where it is necessary in order to solve scheduling problems including (1) providing a classroom session to accompany laboratory sessions where necessary to provide two-hour block, and (2) filling holes in the schedule resulting from postponement of laboratory sessions due to inclement weather.

PREREQUISITES

None

METHOD

This Unit consists entirely of classroom review and discussion involving the need for, and methods of, preparing for safe operation.

MATERIALS

Requirements for materials, beyond those set forth in the Course Specifications, are described in the individual unit specifications.

EQUIPMENT

No requirement beyond those set forth in the Course Specifications are imposed by this Unit.

FACILITIES

No facilities beyond the classroom facilities described in the Course Specifications are required.

PROFICIENCY ASSESSMENT MEASURES

Attainment of knowledge objectives would be assessed through written tests prepared and administered inaccordance with the Course Specifications. Since the Unit does not involve development of skill, no performance test would be required.

MOTORCYCLE SAFETY EDUCATION PROGRAM

UNIT	LESSON	TITLE
VI	1	General Preparation for Travel

PURPOSE

The purpose of this lesson is to enable and motivate students to carry out those activities necessary to prepare themselves and their motorcycles for operation in any environment.

OBJECTIVES

Performance Objectives	Knowledge and Skill Objectives
VEHICLE REQUIREMENTS	
Vehicle Selection--The student must select a motorcycle appropriate to operator size and experience and intended vehicle use.	The student must know the various types of motorcycles, their purpose and operating characteristics. The student must know the hazards associated with operation of the wrong type and size of motorcycle.
Vehicle Preparation--The student must prepare the motorcycle for general operation by fueling, installing accessories and placing on the motorcycle the necessary tools and materials for temporary repairs.	The student must know which parts and components fail most frequently in normal operation.
Inspection--The student must perform a routine inspection of the tires, spokes, chain, fuel supply, engine and transmission oil, cables, controls, headlight, brakelight, and turn signals.	The student must know the location of each part as well as the physical appearance and operating condition required for maximum vehicle control and prevention of accidents and breakdowns.
OPERATOR REQUIREMENTS	
Clothing and equipment--The student must wear clothing and equipment appropriate to the intended area of operation (i.e., on-road, off-road), weather conditions, and time of day.	The student must know the effects of proper clothing and equipment upon protection from injury, reduction of fatigue, and prevention of illness from adverse weather conditions including rain, snow, cold, heat and sun glare.

Alcohol--The student must limit the consumption of alcohol and use of drugs prior to operation.	The student must know the effects of rate and duration of alcohol and drug use upon the ability to operate a motorcycle safely.
Psychological impairment--The student must limit the extent of operation and adjust speed and distances when fatigued, after consuming alcohol or taking a drug or when experiencing strong emotions such as extreme elation, frustration or depression.	The student must know the symptoms and effect of various psychological states and their effect upon operating behaviors.
Physical impairment--The student must limit operation of motorcycle under conditions of physical impairment including arthritis, epilepsy, or heart trouble.	The student must know State requirements and restrictions relating to visual impairments and specific health problems.

LEGAL REQUIREMENTS

Operator requirements--The student must comply with legal regulations relating to securing a learner's permit and license, and in assuring financial responsibility.	The student must know operator age limits, license test and renewal test requirements and any financial responsibility requirements.
Motorcycle requirements--The student must register and title the motorcycle and have it inspected periodically.	The student must know State and local requirements covering registration, titling and vehicle inspection.
Insurance requirements--The student must secure insurance as needed to meet State requirements and personal needs.	The student must know the nature and purpose of liability, collision, comprehensive, and medical coverage.

MOTORCYCLE SAFETY EDUCATION PROGRAM

UNIT	LESSON	SESSION	TITLE	MODE
VI	1	1	General Preparation for Travel	Classroom

PURPOSE

The purpose of this session is to enable and motivate students to carry out those activities necessary to prepare themselves and their motorcycles for operation in any environment.

CONTENT

This Session consists of the following topics:

1. Vehicle Selection
2. Vehicle Preparation
3. Pre-operational Inspection
4. Clothing and Equipment
5. Mental and Physical Factors
6. Legal Responsibility Requirements

MATERIALS

Student Materials

In addition to requirements set forth in the Course Specifications, the following materials should be circulated among the students during instruction:

- Brochures describing various types of motorcycles.
- Copies of license, registration, and insurance forms.

Teacher Materials

See Unit Specifications.

Instructional Aids

Instructional aids will include the following static visuals:

- Vehicle type--Visuals displaying motorcycles of various types and sizes.
- Inspection points--Pictorial visuals displaying various parts to be included in pre-ride inspections and common maintenance problems.

- Accessories--Pictures of accessories required for, and excluded from, safe and legal operation.

- Protective gear--Pictures of proper and improper clothing, helmets, and face protection.

Instead of visual aids, the instructor may wish to exhibit actual items of protective gear. Arrangements might be made to borrow items from a local motorcycle shop.

EQUIPMENT

See Course Specifications.

FACILITIES

This session requires only standard classroom facilities. However, arrangements might be made to hold the session at a local motorcycle shop so that examples of motorcycles, accessories, motorcycle protective gear may be exhibited.

METHODS

1. Vehicle Selection 10 minutes

1.1 Motorcycle Types

The instructor will review and illustrate various types of motorcycles as classifiedin terms of size and purpose.

(1) Size

(a) Size is classified in terms of cubic centimeters of engine displacement.
(b) Size is generally described at three levels:
- Light--up to 200 cc.
- Medium--from 200 to 500 cc.
- Heavy--over 500 cc.

(2) Purpose

(a) Street bike--Designed exclusively for on-street operation. Generally characterized by:
- Soft ride.
- Transmission designed for high speed.
- Powerful brakes.

(b) Trail bike--Designed for off-street or on-street riding. Generally characterized by the following:
- High ground clearance to permit climbing over bumps, rocks, logs.
- Large fender/tire clearance to prevent build-up of mud.
- Transmission designed to produce power for hill climbing rather than speed.

(c) Sport cycle--Used for competitive purposes only. Not appropriate to normal on-street or off-street riding.

1.2 Selective Factors

The instructor will discuss the role of the following in selecting a motorcycle:

(1) Use--Where the student intends to ride.

(2) Size--Student must be able to stand flatfooted across saddle.

(3) Strength--Student must be able to pick up the motorcycle.

(4) Ability

(a) Should start with a small motorcycle.

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(b) Move to a medium and heavy weight motorcycles only with experience.

(5) Price--Keep purchase cost within budget. If the purchase price is too much, can't afford to keep it properly maintained.

2. Vehicle Preparation

15 minutes

2.1 Safety Equipment

The instructor will discuss the following in relation to safety and State requirements.

(1) Lights

- (a) Headlight
- (b) Taillight

(2) Horn

(3) Mirrors

- (a) Most States require a left mirror.
- (b) Safety requires two mirrors.

(4) Passenger pegs--Required if passenger is to be carried.

(5) Reflectors or reflectorized tape--At night, helps to make the motorcycle more detectable from the side or rear.

2.2 Tires

Discuss the following types of tire tread.

(1) Street tread

- (a) Provides for the best grip on a paved surface.
- (b) Should be used on street bikes and others intended exclusively for on-street use.

(2) Universal tires

- (a) Better grip on dirt surfaces than street tires; not as good a grip on paved surfaces.
- (b) Intended to be used on and off-street (i.e., as a "combination" bike).

(3) Knobbies

  (a) Large knob tread intended exclusively for off-street use.
  (b) Provides a very poor grip on a paved surface.
  (c) May be illegal for street use in some States.

2.3 Accessories

Discuss the nature of the following accessories and their relation to safe operation.

(1) Crash bars

  (a) Bars that extend from the side of the motorcycle frame.
  (b) Designed to prevent damage to the vehicle and the operator's leg in the event of a fall.
  (c) May actually increase the chance of injury to the upper torso.
  (d) Should be viewed as a questionable benefit.

(2) Windshield

  (a) Mounted on handlebars (low enough for the operator to look over).
  (b) Deflects wind, insects, sand, dust, and rain from the upper body.
  (c) Reduces fatigue on long trips.

(3) Fairing

  (a) Mounted low on the handlebars or on the frame.
  (b) Deflects wind from the lower portion of the operator's body.
  (c) Along with the windshield, helps to reduce fatigue during long periods of high speed operation.
  (d) Must be of proper size and installation to prevent "wobble."

(4) Sissy Bars

  (a) A back rest for passengers.
  (b) May prevent operator or passenger from leaving the motorcycle in a hurry in an emergency.
  (c) Raises the center of gravity when loads are applied against it.

(5) Highway pegs

  (a) Footpegs attached to the front portion of the frame or safety bars.
  (b) Intended to place operator in more "relaxed" position.
  (c) Potentially hazardous.
    - Keeps feet from providing a stable platform on a rough surface.
    - Increases reaction time for braking.

2.4 Modifications

(1) General

- (a) Motorcycles are designed for maximum performance and wear.
- (b) Any modification of the vehicle will generally adversely affect either performance or wear.
- (c) Modification should be made only by technically qualified individuals.

(2) Extended front forks ("choppers")

- (a) Can cause instability and high speed wobble.
- (b) Increases strain on steering head.

(3) Removal of equipment.

- (a) Some riders remove front brakes, mud and chain guards, mufflers.
- (b) Can cause poor performance, excessive wear and/or hazard to operator and passengers.

3. Pre-Operational Inspection 15 minutes

3.1 The Need for Pre-Operational Inspection

The instructor will review the importance of pre-operational inspection to safe operation.

(1) Breakdowns in traffic or high speed are potentially dangerous.

(2) Need to check critical items before each ride.

(3) Should become a habit so it is not forgotten.

3.2 Cables

(1) Need--Braking or sticking can result in loss of control.

(2) Visual check for frayed strands, loose cable ends.

(3) Operational check for smoothness.

- (a) Squeeze brake and clutch lever.
- (b) Apply footbrake.
- (c) Rotate throttle.

3.3 Lights and Horn

(1) Daytime

(a) Need.

- Count on headlights and brake lights for detectability.
- Dangerous to put trust in lights that are not working.
- Can't tell whether lights are working without checking them.

(b) Checking headlight--Hold hand in front of lens.

(c) Checking taillight/brake light.

- Check when something is behind the motorcycle (vehicle, side of building).
- Hold hand behind taillight.

(2) Nighttime.

(a) Adjust headlight.

- Adjust while on-street.
- High beam should be focused slightly below horizontal (on the most distance observable portion of the road surface).

(3) Turn Signals.

(a) Check left and right, front and back.

(4) Horn.

A tight spot is no place to find the horn doesn't work.

3.4 Tires

(1) Inflation.

(a) Improper inflation affects:

- Handling
- Tire wear

(b) Serious riders:

- Keep a tire gauge in their jackets.
- Check tires before every ride.

(c) Check owners manual for proper inflation under hot and cold conditions.

(2) Tire condition

(a) While checking inflation, inspect for cuts in sidewall, foreign matter imbedded in tread.

(3) Spokes

(a) Visually inspect for broken or loose spokes.

3.5 Chain

(1) Lubrication.

(a) Should be wet in appearance.

(b) A dry chain wears quickly.

(c) Lubicate inside edge of chain with chain lube or heavy oil.

(2) Adjustment.

(a) A loose chain can jump the sprocket.

- Lock the rear wheel.
- Cause a spill

(b) Check tension while seated on the bike.

(c) Should be about 3/4 inch of play.

3.6 Oil Level

(1) Need

(a) Oil loss can cause the engine to seize.
- Locks rear wheel
- May cause spill

(2) Review checks

(a) Dipstick
(b) Window

(3) Motorcycle must be upright while checking (not on sidestand).

3.7 Fuel

(1) Fuel check--open tank and look.

(2) Sound--if not visible, lean motorcycle and listen for sloshing.

(3) Odometer--Discuss the use of the trip odometer as a fuel gauge.

  (a) Determine mileage on a tank full.
  (b) Reset after each fill.
  (c) Don't rely on it completely (someone else may reset the odometer).

4. Protective Gear 10 minutes

4.1 Helmet

(1) Importance of helmet

The instructor will discuss the importance of a helmet in preventing injury or death during an accident.

NOTE: While this topic deserves particular emphasis in States lacking compulsory helmet legislation, it is important in other States as well, since helmet laws are always subject to repeal.

(a) Collision forces

- Rider often is propelled headfirst in a collision.
- In falls, the head generally continues to move after the shoulder strikes the pavement, causing head injury.

(b) Statistics

- States enacting compulsory helmet legislation, have shown a drop in fatality rate in the year following enactment.
- States failing to enact compulsory helmet legislation have shown a comparative increase in fatal accident rate.
- In one State without helmet laws, the fatality rate among non-helmeted riders was approximately three times that of helmeted riders.

(2) Helmet myths

(a) "Helmets cause neck injury"
  - Head injuries are 10-20 times as frequent as neck injuries.
  - Most studies have shown that helmeted riders suffer no more neck injuries than unhelmeted riders.
  - Where neck injuries increase, they are more than offset by the decrease in head injuries.

(b) "Helmets limit hearing"
  - The noise created by wind and engine make the effect of helmet wear unnoticeable.

(c) "Helmets restrict vision"
  - Most of the restriction is in the uncritical vertical plain.
  - Lateral restriction is very small except for full face helmets.
  - Restriction in lateral vision may be offset simply by turning the head.

(3) Proper helmet

(a) An unsafe helmet is no better than no helmet at all.

(b) Construction
  - Instructor should describe or illustrate labels indicating approved construction:
    - American National Standards Institute (ANSI), Z90.1.
    - Snell Memorial Foundation
    - Individual State standards
    - Department of Transportation standards

(c) Color
  - Bright color (white, orange, yellow, red) to attract attraction.
  - Reflective material, or reflective tapes at the back and sides.

(4) Defects

The instructor should illustrate with visuals or actual helmets, the following defects:

(a) Cracked surface.
(b) Loose padding.
(c) Exposed metal inside.
(d) Frayed straps.

(5) Fit.

(a) Helmet size--should be snug but not too tight.

(b) Fastening.
  - Ring fasteners are best.
  - Snap fasteners may pop open on impact.

(c) Straps should be securely fastened every time; a helmet that comes loose in emergency offers no protection.

4.2 Eye and Face Protection

(1) Need for protection

(a) Protects against wind, dust, rain, insects, and small pebbles.

(b) Helps to prevent:
- Temporary loss of vision.
- Injury.
- Fatigue.

(2) Types of protection

(a) Face shield--provides best overall protection.

(b) Goggles--won't protect face; best used along with a windshield.

(c) Glasses--not acceptable as eye protection.
- May blow off.
- May shatter.
- Should be used with a face shield (or obtain prescription goggles).

(3) Requirements--Eye and face protection should meet the following requirement:

(a) Be made of shatterproof material
- Plastic is best.
- May bear the Z2.1 or VSVE8 standard in upper right corner.

(b) Be free of scratches.
- Scratches pick up headlight glare at night.
- Make it harder to see; lead to fatigue.

(c) Fasten securely to prevent being blown off.

(d) Be well ventilated, to prevent fogging.

(e) Provide clear lenses if used at night.
- Tinted lenses reduce light at night.
- Sunglasses more convenient than tinted shield.

4.3 Jacket and Pants

(1) Jacket and pants should provide protection against:

(a) Falls
- Abrasions
- Cuts

(b) Weather
- Wind
- Cold
- Rain

(2) General requirements

(a) Must cover arms and legs.

(b) Sturdy material

- Leather is best.
- Sturdy vinyl or synthetic is acceptable.
- Anything offers some protection.

(c) Fit.
- Snug enough to prevent flapping.
- Loose enough to provide freedom of movement.

(3) Cold weather.

(a) Operating in cold weather can produce :
- Numbness--lack of vehicle control.
- Hypothermia--lowering of body temperature; can cause chill, illness, even death.

(b) Warm clothing.
- Lined, insulated jacket and pants.
- Thermal underwear.

(c) Clothing should fit snug at
- Wrists
- Ankles
- Collar

(4) Warm weather.

(a) Need full coverage to protect against:
- Falls
- Wind chill (can occur even in summer)

(b) Clothing should ventilate without exposing.

(5) Rain.

(a) Protection against rain requires:

- Water resistant material (vinyl, rubber).
- Complete closure at entry point (wrists, ankles, collar, front).

(b) Avoid cheap rainsuits that may balloon up or tear.

4.4 Gloves

(1) Need

(a) Protect hands against:
- Cold
- Injury in a fall

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(b) Improves grip
- Better control
- Reduced fatigue

(2) Requirements

(a) Leather or vinyl; should be lined for best grip.
(b) Seamless palms
(c) Gauntlets

4.5 Footwear

(1) General requirements.

(a) Cover ankles.
(b) Hard soles.
(c) Small heel.
- High enough to hold foot on footpeg.
- Not so high as to catch against rough surfaces.

(d) Reinforced toe.
(e) No rings or lacings that may catch on controls.

(2) Rainwear--treated leather, vinyl, rubber boots.

(3) Avoid riding:
(a) Barefoot.
(b) In sandals.
(c) With tennis shoes.

5. Physical Condition 5 minutes

5.1 Importance of Physical Condition

(1) Skill requirements more demanding than those involved in car driving.
(a) Need to maintain balance.
(b) Maneuvers require greater coordination.

(2) Vulnerability of motorcycle makes judgment more critical.
(a) Mistaken judgment may produce severe injury or fatality.
(b) Many physical conditions can affect judgment.

5.2 Alcohol

(1) Effects of alcohol.
(a) Impairs skill and judgment.
(b) Often tends to produce euphoria in operating a motorcycle.
(2) About half of fatally injured motorcycle operators have been drinking.

5.3 Health

(1) Motorcycling is for the healthy.

(2) Motorcycle shouldn't be ridden in the instance of:

  (a) Illnesses that produce weakness, e.g., heavy cold, flu, injury to limbs.
  (b) Illnesses that produce dizziness, e.g., flu.
  (c) After taking medicationthat may produce weakness, drowziness, or dizziness, e.g. cold tablets, allergy pills.

(3) The rider who experiences weakness, drowziness or dizziness while riding should:

  (a) Pull off the road and wait for the condition to subside.
  (b) Proceed on slowly.

5.4 Fatigue

(1) Operating a motorcycle is more taxing than driving a car owing to:

  (a) Need for constant attention and activity.
  (b) Effect of wind, weather, vibration.

(2) To prevent fatigue from occurring, the rider should:

  (a) Limit distance to 200-300 miles/day in most cases.
  (b) Stop frequently-- about every hour.

(3) Be aware of the symptoms of extreme fatigue and hypothermia:

  (a) Shivering.
  (b) Confusion.
  (c) Slow response.

6. Legal Responsibilities 5 minutes

6.1 Registration

The instructor will review the registration requirements imposed by the State.

(1) Vehicles to be operated on the public streets must be registered.

(2) Registration requirements:

(a) New vehicles.
    - Certificate of origin.
    - Bill of sale.

(b) Used motorcycle.
    - Signed transfer of title.

(c) Many states also require insurance before motorcycle can be registered.

6.2 Insurance

The instructor will discuss the following forms of insurance, indicating minimum liability limits of coverage required by the State:

(1) Liability
  (a) Pays for:
    - Injury to others.
    - Damage to other's property.
  (b) Does not pay for injury or damage experienced by the insured.
  (c) May or may not cover the insured's passengers.

(2) Collision
  (a) Pays for damage to the insured's motorcycle.
  (b) In a "deductible" policy, insurance covers expenses over a specified amount.

(3) Comprehensive--covers expenses other than collision:
  (a) Theft
  (b) Vandalism.
  (c) Storms.
  (d) Fire.

(4) Uninsured motorists' insurance--covers cost of injury, and sometimes personal property, when insured is struck by an uninsured motorist.

6.3 Inspection

If the State requires periodic inspection of motorcycles, the instructor will quickly note:

(1) The frequency of inspection.
(2) The procedure for having the motorcycle inspected.

MOTORCYCLE SAFETY EDUCATION PROGRAM

UNIT	LESSON	TITLE
VI	2	Preparation for Off-Street Travel

PURPOSE

The purpose of this Lesson is to enable and motivate students to prepare for safe and legal operation in off-street areas.

OBJECTIVES

Performance Objectives	Knowledge and Skill Objectives
The student must select a motorcycle appropriate to use in the intended off-street environment.	The student must know those characteristics of motorcycles that are critical to use in the off-street environment.
The student must prepare the motorcycle for safe off-street operation.	The student must know those accessories and modifications needed for safe off-street operation, including those that are required by State and local laws and regulations.
The student must select appropriate areas for off-street operation.	The student must know legal restrictions imposed upon the use of motorcycles in off-street areas.
The student must load the motorcycle properly when transporting it from one place to another.	The student must know various types of equipment used for transporting motorcycles and the safety precaution involved in the use of each.
The student must be able to navigate along a prescribed route to a specified destination.	The student must be able to interpret maps and charts correctly.
The student must wear the attire and carry the equipment appropriate to operation in off-street environment.	The student must know the potential hazards of the off-street environment as well as common vehicle malfunctions.

MOTORCYCLE SAFETY EDUCATION PROGRAM

UNIT	LESSON	SESSION	TITLE	MODE
VI	2	1	Preparation for Off-Street Travel	Classroom

PURPOSE

The purpose of this Session is to enable and motivate students to prepare for safe and legal operation in off-street areas.

CONTENT

This Session consists of the following topics:

1. Vehicle Selection
2. Vehicle Preparation
3. Clothing and Equipment
4. Trip Planning
5. Vehicle Transportation

MATERIALS

Student Materials

In addition to the requirements set forth in Course Specifications, the students should be provided copies of the following:

- Terrain map suitable for navigation; if possible, the map should cover areas that are to be used in Unit V instruction.
- Lists of available off-street areas and regulations pertaining to use of each.

Teacher Materials

See Unit Specifications.

Instructional Aids

Instructional aids will include static visuals depicting the following:

- Vehicle type--Several trail bikes illustrating various features important for operation in the off-street environment.

- Preparation--Accessories and modifications required for off-street operation.

- Protective gear--Clothing required for operation under various conditions of weather and terrain.

- Equipment--Items of equipment that should be carried during off-street operation.

- Transporters--Various types of equipment used to transport motorcycles and proper loading procedures, as well as procedures for towing a disabled motorcycle.

EQUIPMENT

In addition to equipment specified for classroom use in Course Specifications, it is desirable--though not necessary--that the following items of equipment be available to support instruction relative to transporting vehicles:

- A van rigged for transporting motorcycles (including a loading ramp).

- A trailer designed specifically for carrying motorcycles.

FACILITIES

See Course Specifications.

METHODS

1. Vehicle Selection

Using static visuals, the instructor will illustrate and discuss the selection of a trail bike.

1.1 Design

The instructor will illustrate the following design features:

(1) High ground clearance to permit operation over large obstacles.

(2) Large gap between wheel and fender to prevent mud build-up.

(3) Extended travel in the front suspension (at least 6 inches) to improve control when operating on rough surfaces.

(4) Folding footpegs, which collapse upon impact with an obstacle.

(5) Corrugated or waffled surfaces on footpegs to provide firm footing.

1.3 Tires

The instructor will illustrate the following tire treads:

(1) Knobbies

- (a) Large cleats provide more "bite" in soft surfaces.
- (b) Do not provide good grip on paved surfaces.
- (c) Should be used only when the motorcycle is intended exclusively for off-street operation.

(2) Universals

- (a) Provide a compromise:
  - Provide more bite on off-street surfaces than street treads.
  - Tend to be unstable on hard surfaces.
- (b) Universal treads should be used where:
  - Motorcycle serves as a mode of (on-street) transportation.
  - Motorcycle must be ridden, rather than transported, to and between off-street areas.

1.4 Safety Equipment

The instructor will briefly describe the items of safety equipment required on trail bikes.

(1) Lights--Lights are as important to off-street as on-street operation.
- (a) Needed for operation in twilight and darkness.
- (b) Daylight use is important when operating in wooded areas.

(2) Street riding equipment
- (a) The motorcycle must be "street legal" if it is to be operated on-street.
  - As a means of transportation.
  - In riding to an off-street area.
  - When using public roads to move between off-street areas (almost a necessity in long trail rides).
- (b) Required equipment
  - Mirrors (required in almost all states).
  - Electrical signal (required in some states).

1.5 Required Equipment

Discuss equipment required by regulation in local off-street areas.

(1) Spark arrestors--Required to minimize the danger of grass or forest fire.

(2) Muffler--Certain States and localities place strict limits on the noise level of mufflers when operating in off-street areas.

2. Vehicle Preparation

The instructor will briefly discuss the activities required in preparing a motorcycle for off-street operation.

2.1 General Off-Street Operation

(1) Remove equipment that may be damaged or cause injury.

  (a) Mirrors and turn signals.
    - Extend from side of motorcycle; may be damaged when passing through tight places.
    - Tend to break when the motorcycle falls.
    - May carry one mirror if it is necessary to operate on the highway.
  (b) Passenger footpegs.

(2) Secure cables to frame with tape.

  (a) Prevents snagging.
  (b) Duct tape fastened securely.

(3) Tighten nuts and bolts.

  (a) Fasteners tend to loosen when bouncing over rough terrain.
  (b) May use chemical fastener, e.g. "Loctite."

(4) Secure wheel spokes at crossover point (illustrate).

  (a) Reduces likelihood of breakage.
  (b) Prevents one broken spoke from damaging others.

(5) Reduced tire pressure when operating on soft surfaces.
  (a) Provides better traction.
  (b) No lower than 8 psi.

2.2 Special Requirements

The instructor will discuss the following activities required in preparing for operation in particular environments.

(1) Grass or brush.
  (a) Install brush guards on footbrake and gear control lever.
  (b) Prevents grass, brush, weeds from becoming lodged between levers and motorcycle frame.

(2) Dirt and sand.
   (a) Lubricate chain with silicone or graphite; dirt and sand less likely to adhere and cause chain damage than with oil-base lubricants.
   (b) Install dust caps over brake and clutch levers at joints--keeps dirt from entering cables.
   (c) Install rim locks.
      - Prevents slippage of tire on the rim, causing damage to tire valve.
      - Slippage is particularly likely when air presssures are reduced for off-road operation.

(3) Rocky areas--Install rock guards.
   (a) A metal plate that fits over exhaust pipe to protect it from damage.
   (b) Only required if exhaust pipe is mounted beneath the motorcycle.

(4) Water--Seal magneto case.

3. Clothing and Equipment

Instructor will discuss the items of clothing and equipment required in off-street operation.

3.1 Protective Gear

(1) Helmet--Even more important in off-street operation owing to the increased chances of falling or being struck by some object (e.g., tree limb).

(2) Face Protection
   (a) To protect the eyes against branches, flying pebbles.
   (b) Goggles are preferred; face shield is awkward and tends to fog easily.

(3) Jacket and Trousers.
   (a) Arms and legs must be protected against branches, falls.
   (b) Needs hard surface that will resist tearing.
   (c) Requirements for warmth and ventilation the same as described in VI-1.

(4) Boots.
   (a) Must come up well over ankles to protect legs against branches, rocks (fall).
   (b) Should lace tight to offer ankle support (frequently necessary to balance the motorcycle with feet).
   (c) Heels should be beveled (illustrate) to prevent catching in uneven surfaces (e.g., rocks).

(5) Gloves--Need to be durable to protect hands against branches.

3.2 Spare Parts

- (1) Need for parts.
  - (a) Motorcycle is inaccessible to repair facilities.
  - (b) Malfunction could require abandoning the motorcycle.

- (2) Essential items to be carried on motorcycle.
  - (a) Sparkplug.
  - (b) Cables.
    - Clutch, throttle, brake.
    - Should be labeled.
  - (c) Master chain links.
  - (d) Tire repair; at least one of the following:
    - Spare tube.
    - Patching kit.
    - Inflater sealant.

  - (e) Tire pump.
  - (f) Fuse.
  - (g) Tape.
    - Electrical tape.
    - Duct tape.
  - (h) Wire.
  - (i) Standard tool kit.

3.3 Personal Equipment

(1) Compass

(2) Map, chart.

(3) Knife.

(4) Water.

4. Trip Planning

4.1 Area Selection

The instructor will discuss the factors to be considered in selecting areas for off-street operation.

(1) Restrictions
  (a) Time of year (e.g., restrictions during dry season).
  (b) Time of day (e.g., restrictions on riding after dark).
  (c) Permits, fees required.
  (d) Preserved areas.

(2) Access to highways in the event of an emergency

(3) Terrain relative to ability--inexperienced riders tend to get easily fatigued in difficult terrain.

(4) Habitation
  (a) Homes, office buildings--the noise tends to be annoying.
  (b) Farm animals--tend to be frightened by the sound of motorcycles.

(5) Permission--should be obtained even where other riders use the area.

4.2 Navigation

(1) Navigational aids
The instructor will discuss and illustrate with visual aids and handouts the use of navigational aids.
  (a) Charts, maps (e.g., U. S. Coast and Geodetic Survey).
  (b) Interpretation of map symbols:
    - Roads, railroad crossings.
    - Rivers and creeks.
    - Topography.
    - Vegetation.

(2) Charting a course.
The instructor will conduct a brief classroom exercise in charting a course that is appropriate to the following:
  (a) Level of rider skill.
  (b) Time available.
  (c) Access to highways.
  (d) Area restrictions.
  (e) Fuel capacity.

(3) Enroute navigation.
The instructor will discuss the use of the following in navigating a course.
   (a) Signs and trail markers.
   (b) Landmarks
      - Natural landmarks.
      - Trail marking (e.g., breaking twigs).
      - Sun and compass to allow travel in a straight line (will ultimately bring the rider to a known location).

4.3 Advanced Precaution

(1) Travel with others--provide someone to go for help in the event of injury or breakdown.
(2) Inform others:
   (a) Area of operation.
   (b) Intended destination.
   (c) Estimated time of return.

(3) Plan to return before dark. When operating after dark:
   (a) Easy to run into trees, rocks, etc.
   (b) Easy to get lost.
   (c) Hard for others to find rider.

5. Transporting Motorcycles

5.1 Methods of Transportation

(1) Van, truck.
   (a) Provides the easiest and safest method of transporting motorcycles.
   (b) Is expensive unless the vehicle is available for other purposes.
   (c) Requires installation of special hardware:
      - Eyes or hooks in the floor for straps to keep motorcycle secure and in upright position.
      - A rack to secure the front tire.
   (d) A ramp is required to load the motorcycle.
      - Lightweight steel or aluminum.
      - Channels on both sides to keep motorcycle from falling.
      - Long enough to provide gradual incline.
   (e) Generally requires two people to load a motorcycle.

(2) Motorcycle trailer.
   (a) Different models accommodate up to four motorcycles.
   (b) Number of motorcycles is less than capacity, they must be loaded in a balanced fashion.
   (c) Requires an appropriate trailer hitch.

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        - Follow recommendations of trailer manufacturer.
        - Adhere to State/local regulations (trailer registration, safety chain, lights).

(3) Bumper carriers.
    (a) Mount on rear bumper of automobile.
    (b) Extreme rear position, adversely affects handling characteristics of automobile.
        - Suitable only for lightweight motorcycles (100-150 cc).
        - Not suitable for travelling long distances.
    (c) Useful for the rider who transports motorcycles infrequently.

5.2 Loading Procedures

The instructor will describe and demonstrate procedures for loading motorcycles in vans and on trailers.

(1) If possible, the demonstration should be made with actual vehicles in an area outside the classroom.

    (a) Students should assist in the loading process to get hands-on experience.

    (b) If the class session immediately precedes a trail-riding session, students may help load the motorcycles for transportation to the instruction site.

(2) If vehicles are unavailable, dynamic visual aids or a series of static aids, should be used instead.

(3) The following loading procedures should be demonstrated:
    (a) Van, truck:
        - Setting ramp
        - Moving the motorcycle up the ramp.
        - Securing the motorcycle inside the vehicle.
        - Rolling the motorcycle down the ramp.
    (b) Trailer.
        - Hitching trailer.
        - Loading and securing motorcycles on the trailer.
        - Backing the trailer.

5.3 TOWING A DISABLED MOTORCYCLE

The instructor will illustrate procedures of towing a disabled motorcycle.

(1) Tow Rope--

(a) Length--Approximately 50 foot length is required to attach and provide adequade vehicle separation.

(b) Diameter--Approximately 1/2 inch.

- Lighter line is too weak, too hard to grip.
- Heavier line is too much to carry.

(2) Fasten to pulling motorcycle--tie to frame.

(a) Don't tie to taillight, turn signals or other members that might pull off.

(b) Keep free of drive chain.

(3) Fasten to disabled motorcycle.

(a) On flat level surface--Rider should hold the line.

- Easier to take up slack caused by varying speed and load.
- Easier to cast off in a hurry.

(b) On upgrade or resistive surface---snub once around handlebars.

- Keeps rider from being pulled off motorcycle.
- Allows quick release if necessary.

(4) Don't tow a motorcycle on public highway.

(a) Dangerous to travel highway speed in tow.

(b) Illegal in many States.

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